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June 2, 2004

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Dear BCT members:

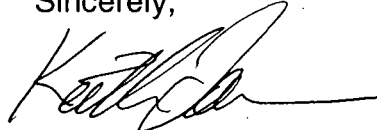
Presented to you is enclosure (1) the U.S. Department of the Navy (Navy) responses to comments from the regulatory agencies on the draft "Sampling and Analysis Plan (SAP) (Field Sampling Plan and Quality Assurance Project Plan) Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California," dated December 18, 2003. This package contains responses to comments from the U.S. Environmental Protection Agency (EPA), Region IX submitted on February 2 and 25, 2004; Arc Ecology comments submitted on February 3 and March 2, 2004; Treadwell and Rollo comments submitted on behalf of the City on March 4, 2004, California Regional Water Quality Control Board (RWQCB) comments submitted on February 22 and March 22, 2004 and Department of Toxic Substances Control (DTSC) comments submitted on March 18, 2004. This enclosure also contains California Environmental Protection Agency Department of Toxic Substances Control (DTSC) comments regarding Parcel B submitted on February 10, 2004.

All of the comments provided have been addressed and a meeting has been scheduled for June 15, 2004 to discuss the responses to comments. Following this meeting, final revisions to the SAP will be completed. This package is being submitted to you in preparation for discussion at the planned June 15, 2004 groundwater meeting at the Tetra Tech EMI San Francisco office starting at 9:00 am. A separate notification will be sent by email for the meeting. A final set of responses addressing agency comments will be included with the Final SAP.

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Should you have any concerns with this matter, please contact the undersigned at (619) 532-0913.

Sincerely,



KEITH FORMAN
BRAC Environmental Coordinator
By direction of the Commander

Enclosure (1) U.S. Department of the Navy (Navy) responses to comments from the regulatory agencies on the draft "Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California," dated December 18, 2003, June 2, 2004

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**RESPONSES TO REGULATORY AGENCY COMMENTS ON THE
DRAFT SAMPLING AND ANALYSIS PLAN
(FIELD SAMPLING PLAN AND QUALITY ASSURANCE PROJECT PLAN)
BASEWIDE GROUNDWATER MONITORING PROGRAM
HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA**

This document presents the U.S. Department of the Navy (Navy) responses to comments from the regulatory agencies on the draft "Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California," dated December 18, 2003 (hereinafter referred to as the draft SAP). The U.S. Environmental Protection Agency (EPA), Region IX submitted comments on February 2, 2004, and clarified some comments on February 25. Arc Ecology submitted comments on February 3 and March 2, 2004. On behalf of the City of San Francisco, Treadwell and Rollo submitted comments on March 4, 2004. The California Regional Water Quality Control Board (RWQCB) submitted comments on February 22 and March 22, 2004. The California Environmental Protection Agency Department of Toxic Substances Control (DTSC) submitted comments regarding Parcel B on February 10 and comments about major issues for Parcels C, D, and E on March 18, 2004. All comments were received via electronic mail except the DTSC's comments on Parcel B, which were sent as hard copy only.

RESPONSES TO COMMENTS FROM EPA

General Comments

1. **Comment:** Section 1.1.2, Problem to be Solved, Page 2: The text states, "Additional wells proposed for monitoring beyond the RAMP requirements are including (sic) in this SAP," but the proposed new wells replace the abandoned wells and are necessary to meet the Record of Decision (ROD) requirements. Other wells that have been added in the past, for example, at IR-26, were not included in the RAMP, but are necessary to fulfill ROD requirements. Please revise the quoted statement to clarify which wells are referenced or delete it.

Response: The statement in Section 1.1.2 has been deleted.

2. **Comment:** Section 2.3.4.3, Oil Reclamation Ponds, Page 23: The text states that "A-aquifer groundwater flows primarily north, towards the sink located at the boundary between parcels D and E," but this does not address groundwater between the sheet-pile wall and the Bay. Please revise the quoted sentence to clarify that groundwater north of the sheet-pile wall flows to the north.

Response: Section 2.3.4.3 has been revised to more accurately describe groundwater flow patterns at the former Oil Reclamation Ponds Area. This includes clarifying that groundwater inland of the sheet-pile wall generally flows toward the north and that groundwater flow on the San Francisco Bay (Bay) side of the sheet-pile wall fluctuates between the wall and the Bay, depending on the tide.

3. **Comment:** Section 2.3.4, Parcel E, Page 22: The text states that the large groundwater sink between parcels D and E is believed to be the result of groundwater removal by pumping the sanitary sewer, but some sanitary sewer lines are being blocked off, which will likely impact groundwater flow. This is an important issue, because if the sewers are controlling the groundwater flow direction, they are also controlling plume migration. When the sewers are blocked, contaminant plumes may start migrating on any parcel where sewers were blocked. It may not be a good idea to wait for a year or more to implement changes to the monitoring plan, but the proposed groundwater monitoring program does not allow for this possibility. Please include a brief statement about the probable changes in groundwater flow due to changes in the sewer system and discuss how changes in groundwater flow could impact movement of contaminant plumes. Also, please explain how the potential movement of contaminant plumes will be monitored if significant changes in the groundwater flow direction are observed.

Response: Groundwater samples and water level measurements will be collected on a quarterly basis, allowing for timely recognition of possible groundwater flow pattern changes and plume migration. The Navy has, over the course of the groundwater data gaps investigation (GDGI), obtained groundwater elevation measurements at numerous monitoring locations adjacent to utility lines and has established an adequate understanding of groundwater flow patterns at Hunters Point Shipyard (HPS) that accounts for utility line effects. Future changes in the current flow patterns caused by alteration of utility lines are expected to be identified with the groundwater elevation monitoring network proposed in Section 1.6.4, "Reports Generated," indicates that both quarterly and annual monitoring reports may include recommendations for improvements to the basewide groundwater monitoring program (BGMP). Text has been added to the second paragraph of Section 3.0 to explain that groundwater flow directions as well as analytical results will be evaluated to determine necessary changes to the BGMP.

4. **Comment:** Section 3.2, Isolated Detections of Organic Chemicals and Hexavalent Chromium, Page 26 and Section 3.3, Isolated Elevated Metals Concentrations, Page 26: The text states that “at least one result for the dry season (May through October) and the wet season (November through April) was considered necessary to evaluate potential seasonal effects, but two results are not sufficient to determine whether observed changes are due to seasonal effects or to some other factor(s) (e.g., sampling artifacts, laboratory problems, normal variability). In general, at least two years (4 or more samples) of data are required to evaluate seasonal effects. Please revise the text to indicate that two or more years of data are necessary to evaluate seasonality. Also, please re-evaluate any decisions that were based on this criteria; if there are only two samples, conclusions about seasonal effects are most likely premature and additional data collection would be necessary to confirm seasonal effects. Please discuss the specific wells impacted in the response to comments and revise the sampling plan as necessary.

Response: The Navy’s approach in the BGMP is designed to evaluate seasonal effects on changes in concentrations; the Navy considers data from different seasons before deciding that a well does not require further sampling. The Navy presented its approach for selecting wells for groundwater sampling at a Base Realignment and Closure Cleanup Team (BCT) meeting on September 3, 2004. That approach specified that a well could be excluded from further sampling if the three most recent results did not exceed the selected criteria (Hunters Point groundwater ambient level [HGAL] for metals and detections for organic chemicals). At that meeting, BCT members asked that seasonality be considered in making the decision. The Navy then added the criterion that the three or more most recent results used to make a decision include at least one wet season result and at least one dry season result. The Navy believes that this approach is appropriate for well selection. However, any well may be proposed for future sampling by the regulatory agencies to evaluate potential changes in concentration due to seasonal effects.

5. **Comment:** Section 3.4, Groundwater Levels, Page 27 and Figure G-1, A-aquifer Wells Selected For Groundwater Level Measurements: It is difficult to evaluate whether the wells selected for water level measurements are appropriate and sufficient because Figure G-1 does not include all of the monitoring wells that are present at Hunters Point. Please revise Figure G-1 to include all of the monitoring wells.

Response: Figure G-1 shows all A-aquifer monitoring wells at HPS, including those A-aquifer wells screened in bedrock. Figure G-2 shows B-aquifer and bedrock water-bearing zone monitoring (WBZ) wells. Figure G-2 has been revised, and replacement copies were issued on February 16, 2004.

6. **Comment:** Section 8.3.3, Groundwater Level Measurements and Immiscible Layer Monitoring, Page 53 and Table G-1, Wells Selected for Groundwater Level Measurement: The second sentence of this section refers to “an additional group of wells specified in Appendix G (Table G-1)”, but this additional group of wells is not apparent in Table G-1. It is not clear if the additional group of wells is included in the listing of wells from the A or B aquifers or if it is the bedrock water-bearing zone. Please indicate these additional wells in Table G-1.

Response: Table G-1 lists all monitoring wells where water levels will be measured. Section 8.3.3 has been revised in the final SAP to clarify the text. The second sentence will be changed to “Water levels will be measured in all wells listed in Table G-1 to (1) provide lateral coverage of HPS, (2) delineate the extent and persistence of groundwater mounds and sinks, and (3) provide additional groundwater elevation data in areas where flow directions are not clearly understood.”

7. **Comment:** Section 8.3.3.2, Groundwater Level Measurements, Page 55: The text specifies that a second reading will be taken to confirm the first, but does not specify a procedure to resolve differences in the two measurements. Please explain the procedure to be followed if the two measurements do not agree.

Response: At each well, the field technician will make two water level measurements. If these measurements are identical, the value will be recorded as the depth to water. If the two measurements are not identical, additional measurements will be made until the technician making the measurements is satisfied that the correct water level has been determined by obtaining repeated measurements that do not differ by more than 0.01 foot. The value so determined by the technician will be recorded as the depth to water. Section 8.3.3.2 has been revised to clarify this method of collecting depth to groundwater measurements. Also, the groundwater elevation measurement log in Appendix B has been revised so that there are two columns for depth to groundwater measurements.

8. **Comment:** Section 8.3.4, Groundwater Sampling Methods, Page 58: The text is unclear regarding when to use low-flow rate purging. The text on page 58 indicates that low-flow rate purging techniques will be used where technically feasible, which is defined as wells where depth to water is less than 25 feet below ground surface (ft bgs) or where recharge rates are high enough support low-flow sampling. Contrary to what the text states, monitoring wells with historic low recharge rates are good candidates for low-flow rate purging and sampling. Also, there is no indication that wells susceptible to purging dry will be purged and sampled using low-flow techniques. Please include criteria for low-flow rate purging and either explain why wells with low recharge rates make low-flow rate purging technically infeasible or revise the text to indicate that wells with low recharge rates should be purged and sampled using low-flow techniques.

Response: The Navy agrees that monitoring wells with historic low recharge rates are good candidates for low-flow rate purging. The text of Section 8.3.4 does not contradict that concept. Indeed, that concept is the basis for the procedures described in Section 8.3.4.2. EPA defines acceptable sampling rates of 0.1 to 0.5 liter per minute (L/min) for low-flow-rate sampling (Puls and Barcelona 1996). ASTM International (formerly American Society for Testing and Materials) Standard D6771-02, which describes the standard practice for low-flow-rate purging and sampling, does not define acceptable purging rates, stating instead that purging rates should be decided on a well-by-well basis. The Navy believes that 0.05 L/min is a lowest practical purging rate for sampling monitoring wells, considering sample volume requirements and capabilities of the sampling pumps. In some cases at HPS, the monitoring wells are screened in formations that will not support purging rates of 0.05 L/min, and wells will continue to draw down when pumping at flow rates of 0.05 L/min, indicating that the discharge from the pump consists of standing water from the well casing rather than recharge from the formation. By a recharge rate "high enough to support low flow-rate sampling," the Navy referred to wells with recharge rates higher than 0.05 L/min. The text in Section 8.3.4 has been changed to clarify this term. Wells that draw down beyond the maximum acceptable level recommended by ASTM International Standard D6771-02 (25 percent of the distance between the top of the well screen and the pump intake [2.5 feet for a 10-foot saturated well screen]) will be sampled as usual, except that the pump will be stopped when drawdown reaches the level recommended by ASTM International Standard D6771-02 and allowed to recharge to 80 percent of the pre-pumping equilibrium water level before continuing the purging and sampling procedure. This purging and sampling technique is designed to sample water from the formation rather than standing water from the well casing.

9. **Comment:** Section 8.4.4, Chain of Custody, Page 65 and 8.4.5, Sample Shipment, Page 66: The text does not indicate that individual samples will be custody sealed. The sample shipment section includes instructions for packaging, preserving, and shipping the samples and the chain of custody section includes instructions for filling out chain of custody forms, however, neither of these sections include instructions for custody sealing individual sample containers. Please explain this omission or include these instructions in one of these sections.

Response: Text describing the application of custody seals to individual sample containers has been added to Section 8.4.5. The text specifies, however, that custody seals not be placed on samples for volatile organic analyses because the adhesive on the custody seals may interfere with the analyses. Custody seals on samples for volatile organic analyses will be placed on the outside of the plastic bags the sample containers are shipped in. Text specifying the placement of clear tape over the custody seals was also added to Section 8.4.5.

10. **Comment:** Section 8.7.1, Maintenance of Field Equipment, Page 74: It is unclear what constitutes a critical measurement. On page 74, the text states, "However, more stringent testing, inspection, and maintenance procedures and schedules may be required when field equipment is used to make critical measurements." Please include a description of what constitutes a critical measurement and provide a few examples.

Response: The term "critical measurement" is confusing and not relevant to the BGMP. The sentence quoted in the comment has been deleted in the final SAP.

Specific Comments on Parcel B

1. **Comment:** Figure 4, Groundwater Sampling Well Network for Parcel B and Table 7A, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel B: There are no wells proposed to monitor the migration of the contaminant plume surrounding IR26MW41A. Groundwater at this location flows in opposite directions, towards the Bay and towards Parcel C, yet neither direction is proposed for monitoring. The contaminants at this location include manganese, nickel, lead, zinc, and mercury. Please explain how the migration of this plume towards the Bay and Parcel C will be monitored, or include wells located at the edge of the plume and adjacent to the Bay in this Basewide groundwater monitoring program.

Response: The data do not indicate a contaminant plume at remedial action monitoring plan (RAMP) point-of-compliance (POC) Installation Restoration (IR) monitoring well IR26MW41A, and the comment incorrectly characterizes the metals in groundwater at this well. Neither lead nor mercury were detected at this well, and zinc concentrations have not exceeded criteria. There has been only one exceedance of manganese and nickel at this well in 19 sampling events.

2. **Comment:** Table 7A, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel B: Historically hexavalent chromium has been found in IR10MW12A in Parcel B (ITSI, 2003), but none of the downgradient wells are being tested for chromium (IR10MW33A, IR10MW59A, IR10MW61A, IR10MW13A1). Please address this data gap.

Response: The Navy has addressed this data gap in conjunction with previous quarterly sampling at Parcel B. Wells IR10MW59A, IR10MW61A, and IR10MW13A1 are not proposed for hexavalent chromium analysis in Year 5 of the RAMP because hexavalent chromium has not been detected at any other well in IR-10 besides well IR10MW12A and, therefore, appears to be confined to this well. Well IR10MW13A1 was analyzed for hexavalent chromium nine times (eight times from 1989 to 1994 and once in 2001). Wells IR10MW33A and IR10MW59A were analyzed for hexavalent chromium in 2001. Additionally, two monitoring wells (PA50MW01A and IR10MW31A1) located downgradient from IR10MW12A and two wells (IR61MW05A and IR10MW28A) cross-gradient from IR10MW12A will be sampled for chromium and hexavalent chromium, as indicated on Figure 4 and in Table 7A.

The RAMP will be re-evaluated after 5 years of monitoring have been completed. Monitoring for hexavalent chromium will be further evaluated at that time.

3. **Comment:** Table 7A, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel B: Lead contamination has been found in the vicinity of IR46MW37A in the past, but this well is not being analyzed for lead under the current plan. Please include lead in the analysis for this well.

Response: Table 7A does indicate that well IR46MW37A will be sampled for metals, and Table 10 indicates that the Navy will analyze Parcel B samples for metals in accordance with EPA Contract Laboratory Program (CLP) methodology. Concentrations of lead in groundwater samples collected from RAMP POC monitoring well IR46MW37A have never exceeded criteria.

Specific Comments on Parcel C

- Comment:** Table 7F, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Nonplume Monitoring Wells and Figure 9 Groundwater Sampling Well Network for Parcel C, Nonplume Wells: No monitoring wells are proposed to monitor for molybdenum at IR30. Molybdenum was detected at IR30MW01F above its criterion at 360 ug/L in 2002. Please include this well in the Basewide groundwater monitoring program and monitor it for molybdenum.

Response: Well IR30MW01F has been removed from Table H5, and Table 7-F has been revised to indicate that IR30MW01F may be added in the future.

- Comment:** Table 7F, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Nonplume Monitoring Wells and Figure 9 Groundwater Sampling Well Network for Parcel C, Nonplume Wells: The PA50MW03A is not proposed for VOC monitoring. This well is located downgradient of the RU-C1 VOC plume and between the plume and the shore. Please include VOCs in the analytical suite for PA50MW03A.

Response: In the draft BGMP, both Figure 9 and the third page of Table 7F propose that well PA50MW03A will be sampled for volatile organic compounds (VOC). Table 7F indicates that PA50MW03A will be sampled for VOCs as a downgradient monitoring location that will also help delineate vertical contaminant migration from Remedial Unit (RU-) C1, although VOCs were not detected during previous sampling rounds. Well PA50MW03A will also be sampled for cyanide because of a cyanide detection of 1.2 micrograms per liter ($\mu\text{g/L}$) in March 1996. Cyanide was not detected above detection limits of 10 $\mu\text{g/L}$ in two samples from PA50MW03A; one from March 1993 and the other from July 2002. To avoid confusion, PA50MW03A has been moved to Table 7-B and is now identified as selected for sampling on Figure 5 instead of Figure 9.

RU-C1

- Comment:** Figure 5, Groundwater Sampling Well Network for RU-C1, Parcel C: There are no sentinel wells along the shoreline to monitor contaminant migration into the Bay. Considering the direction of groundwater flow, it may be advisable to have wells to monitor contaminant migration into the Bay. Please discuss why the contaminant plumes are not believed to discharge into the Bay or consider installing some sentinel wells along the eastern boundary of the site.

Response: The southern edge of the VOC plume at RU-C1 has been delineated by five wells that have consistently shown either low VOC concentrations (less than 1 µg/L) or where VOCs have not been detected (with reporting limits of 1 µg/L or less). Monitoring wells PA50MW03 and IR28MW171A beyond the southern edge of the plume are included in the sampling program. If future monitoring data show an increase in VOC concentrations at the wells, the Navy will consider installing additional wells to redefine the edge of the plume. The only nearby Bay well not included is monitoring well IR28MW271A. Regarding possible discharges of groundwater contamination to the Bay, the Navy intends to evaluate the potential risk based on the concentrations in the existing wells. If a potential unacceptable risk is identified based on that evaluation, the Navy will evaluate the need for additional wells closer to the Bay.

2. **Comment:** Figure 5, Groundwater Sampling Well Network for RU-C1, Parcel C and Table 7B, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C1: Aroclor-1260 was found in well IR28MW155A in the past, but polychlorinated biphenyl (PCB) analyses are not included for this well. Please explain this exclusion or add PCB analysis to Table 7B.

EPA Clarification: It appears that the words "in the vicinity of" were omitted before "IR28MW155A." Aroclor 1260, a polychlorinated biphenyl (PCB) was detected in IR28MW129A, at a concentration of 23 micrograms per liter (ug/L). This detection is most likely associated with the light-non-aqueous phase liquid (LNAPL) that has also been detected in this well. The closest well downgradient to IR28MW129A is IR28MW155A, so we recommended that a groundwater sample from IR28MW155A be analyzed for PCBs.

Response: The Navy agrees. Polychlorinated biphenyl (PCB) analysis will be added to the list of analytes for monitoring well IR28MW155A. Table 7B has been modified accordingly.

RU-C2

1. **Comment:** Figure 6, Groundwater Sampling Well Network for RU-C2, Parcel C: Carbon tetrachloride contamination extends further west of Building 258 than is presently monitored. Another monitoring well is needed to define the western edge of the plume.

Response: Please refer to Figure 9 and Table 7F. Well IR28MW188F, which is located west of Building 258, will be sampled for VOCs, including carbon tetrachloride. Additionally, well IR29MW85F, located west/southwest of Building 258, will also be sampled for VOCs, including carbon tetrachloride.

RU-C4

1. **Comment:** Figure 7, Groundwater Sampling Well Network for RU-C4, Parcel C: Monitoring wells IR29MW58F AND IR29MW85F are not included in the Basewide groundwater monitoring program. According to Figure 6-4 of the Groundwater Summary Report (TtEMI, Parcel C, 2003), Tetrachloroethene (PCE) was detected during 2002 in samples collected from these wells at 22 ug/L and 45 ug/L, respectively. These two wells lie outside of the RU-C4 groundwater volatile organic contaminant (VOC) plume as defined on Figure 7. Please include these two wells in the program and analyze samples collected from them for VOCs.

Response: Both monitoring wells IR29MW58F and IR29MW85F are to be sampled for VOCs as indicated in Table 7F and on Figure 9. Because these wells are not associated with the RU-C4 contaminant plume, the proposed sampling plans for these wells are not addressed on Figure 7 and in Table 7D.

2. **Comment:** Table 7D, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C4 and Figure 7, Groundwater Sampling Well Network for RU-C4, Parcel C: There are no wells proposed to monitor mercury at this site. According to Figure 6-13 of the Groundwater Summary Report (TtEMI, Parcel C, 2003) mercury was detected at IR28MW933F2 above its criterion in 2001. The IR28MW933F2 is not part of the Basewide groundwater monitoring program, please either include IR27MW933F2 and sample it for mercury or include mercury in the analytical suite for adjacent monitoring well IR28MW211F.

Response: As requested in the comment, mercury is now included as an analyte for monitoring well IR28MW211F, and Table 7D has been modified accordingly. Also, the statement that mercury has not been detected in wells surrounding IR28MW933F2 has been deleted from the rationale provided for IR28MW933F2 in Table H-3 because mercury had been detected above the HGAL at well IR28MW211F in March 2001.

RU-C5

1. **Comment:** Figure 8A, Groundwater Sampling Well Network for RU-C5 Parcel C: Groundwater flow converges between the two RU-C5 VOC plumes, but no monitoring wells were chosen for sampling in this convergence area. Please consider sampling a well downgradient of the converging groundwater flows.

Response: Although not specifically identified for RU-C5 on Figure 8A or in Table 7E, well IR06MW42A, which is downgradient of the RU-C5 groundwater flow convergence area, will be monitored for hexavalent chromium, metals, PCBs, pesticides, semivolatile organic compounds (SVOC), total dissolved solids, total petroleum hydrocarbons (TPH), and VOCs as part of the Parcel B RAMP (Figure 4 and Table 7A). Groundwater flow direction in this area will be determined quarterly to monitor potential impacts from sewer line repair work.

2. **Comment:** Figure 8A, Groundwater Sampling Well Network For RU-C5 Parcel C and Table 7E, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C5: Pesticides and metals were detected in well IR25MW62F in the past (TtEMI Parcel C, 2001) but this well is not being analyzed for these contaminants. Please explain this omission or add these constituents to Table 7E.

EPA Clarification: It appears that the words "in the vicinity of" were omitted before "IR25MW62F." Pesticides and metals were historically detected in IR25MW15A2, which was located in the vicinity of new well IR25MW62F. Since the A2 aquifer overlies bedrock, it is not clear why samples from IR25MW62F will not be analyzed for metals and pesticides. In addition, the anaerobic/aerobic treatability study to be conducted in RU-C5 may result in mobilizing metals when the ambient conditions (e.g., pH and oxidation-reduction potential) are changed by the injected amendments. Therefore, we recommend that, at a minimum, analyses for metals be added to the analytical suite for this well.

Response: The Navy has decided not to install IR25MW62F because installation of a well at that location conflicts with treatability study plans for RU-C5. Several new wells have been installed in the RU-C5 area to support the treatability study and these wells are expected to provide the data that IR25MW62F was expected to provide. The Navy will consider analyzing metals in some of these wells as part of the treatability study. Well IR25MW62F has been deleted from Table 7-E and removed from Figures 8A and 8B.

3. **Comment:** Table 7E, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C5 and Figure 8A Groundwater Sampling Well Network for RU-C5, Parcel C: The IR25 VOC plume does not appear to be bounded by the wells included in the program. Going counter-clockwise from proposed new wells IR25MW61A1 and IR25MW61A2, the entire northwest edge of the plume is not bounded by a upper A-aquifer monitoring well. The southern edge of the plume, in the vicinity of IR25MW16A, will not be monitored in this program. Trichloroethene (TCE) was detected at this location at a concentration of 150 ug/L in 2002. According to the Groundwater Summary Report (TtEMI, Parcel C, 2003) the maximum concentration of VOCs detected at IR25 were located at IR25MW19A and IR25MW15A1. Please explain why the wells containing the highest concentrations of VOCs at this site are not included in the program. If the wells are not included because of the anaerobic/aerobic treatability study, please consider sampling them before they are destroyed. Also, it is not clear that destruction of IR25MW19A is necessary; it should be preserved, if possible. Please propose upper and lower A-aquifer wells on the northwest edge of the plume, the south edge of the plume, and include IR25MW16A as an IR25 VOC plume monitoring well.

Response: In preparation for a treatability study, wells IR25MW19A and IR25MW15A1 were decommissioned along with 11 other wells near the sump and dip tank at Building 134. The decommissioned wells were replaced by seven wells in the Building 134 treatability study area. Baseline sampling to be conducted prior to the beginning of the treatability study will include VOC analysis.

Regarding proposing upper and lower A-aquifer wells on the northwest edge of the plume, although not specifically identified for RU-C5 groundwater monitoring on Figures 8A or 8B or in Table 7E, wells IR25MW17A and IR25MW37A, both screened in the upper A-aquifer and located at or near the northwestern edge of the IR-25 plume, will be monitored as part of the Parcel B RAMP (Figure 4 and Table 7A). IR25MW17A will be monitored for hexavalent chromium, metals, total suspended solids (TSS), TPH, and VOCs. IR25MW37A will be monitored for VOCs only. Notes explaining this have been added to Figures 8A and 8B of the final SAP.

Although IR25MW38B, a lower A-aquifer well in this area, is not included in the BGMP at this time, it may be added in the future.

Regarding the suggestion to propose upper and lower A-aquifer wells for the southern edge of the plume, well pair IR25MW39A and IR25MW39B is not included as part of the BGMP at this time, but may be added in the future. Low levels of VOCs (perchloroethylene [PCE], 1,2-dichlorobromide [1,2-DCB], and 1,4-DCB at less than 1 µg/L) have

been detected in IR25MW39A. The rationale text in Table H-4 for these two wells has been changed to state that they may be sampled in the future.

Regarding inclusion of well IR25MW16A in the BGMP, this well will be monitored for PCBs, SVOCs, and VOCs as part of the BGMP (Figure 9 and Table 7F indicate nonplume Parcel C wells selected for monitoring). A note explaining this has been added to Figures 8A and 8B.

In summary, the Navy has selected wells to monitor the source area, the downgradient edge, and the lateral edges of the IR-25 VOC plume and considers the selection adequate at this time. As stated previously and noted in the Appendix H tables, additional wells may be selected for sampling in the future. Groundwater flow direction in this area will be determined quarterly to monitor potential impacts on plume migration from sewer line repair work.

4. **Comment:** Table 7E, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C5 and Figure 8A Groundwater Sampling Well Network for RU-C5, Parcel C: The monitoring wells at IR254 where SVOCs and PAHs have been detected above criterion are not included in the Basewide groundwater monitoring program. Monitoring wells at IR25 proposed for polynuclear aromatic hydrocarbon (PAH) or semi-volatile organic compound (SVOC) analysis do not appear to have historical detections of these analytes. Please include IR25MW11A which contained detections above criterion of phenanthrene (120 ug/L) and fluorene (130 ug/L) in the Basewide groundwater monitoring program.

Response: IR25MW11A was not selected for the BGMP because light nonaqueous-phase liquid (LNAPL) has been detected in the well. This well was erroneously excluded from the groundwater level measurement program where LNAPL measurements will be conducted. This well has been added to Table G-1 and Figure G-1 in the final SAP. IR25MW11A may be sampled in the future in place of surrounding wells if no LNAPL is found during the water level measurement events.

5. **Comment:** Table 7E, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C5 and Figure 8A Groundwater Sampling Well Network for RU-C5, Parcel C: Monitoring wells at IR25 are not proposed for metals monitoring. Nickel, chromium, and thallium were detected at IR25MW11A and IR25MW17A above criteria, according to Figure 7-19 of the Groundwater Summary Report (TtEMI, Parcel C, 2003). Please include these wells in the Basewide groundwater monitoring program and sample them for metals.

Response: IR25MW11A was not selected for the BGMP because LNAPL was detected in this well, as discussed previously in the response to EPA-s RU-C5 specific comment 4. Well IR25MW17A, although not specifically identified for RU-C5 groundwater monitoring on Figures 8A or 8B or in Table 7E, will be monitored as part of the Parcel B RAMP for hexavalent chromium, metals, TSS, TPH, and VOCs (Figure 4 and Table 7A). A note has been added to Figures 8A and 8B identifying IR25MW17A as the well selected for Parcel B RAMP monitoring.

6. **Comment:** Table 7E, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel C, Remedial Unit C5 and Figure 8B Groundwater Sampling Well Network for RU-C5, Parcel C, Zoom: The two new wells, IR25MW62F and IR25MW60A2, proposed to monitor for dense non-aqueous phase liquids (DNAPL) in the Lower A-aquifer zone are not located to the northwest of the dip tank area. It appears that the area downslope or west-northwest from the sump and dip tanks and IR25MW15A2 is a data gap. The Responses to Regulatory Agency Comments on the Draft Parcel C Groundwater Summary Report, Phase III Groundwater Data Gaps Investigation, Hunters Point Shipyard, submitted on September 2, 2003, indicates (page 18) that in order to address this data gap, new monitoring wells were recommended along the A2-aquifer-bedrock interface to the north, northwest, and west-northwest. However, additional wells were not proposed to the west-northwest or northwest. The IR25MW60A2, although located in the Lower A-aquifer, is located north of the sump. Please proposed another new well to monitor for DNAPL in the Lower A-aquifer zone to the west-northwest of IR25MW15A2, the dip tanks, and the sump area.

Also, it appears that there are discrepancies between Table 7E and Figure 8B. Some entries list different aquifer zones for some monitoring wells; for example, on Figure 8B, the red star for IR25MW60A1 indicates that it is an A2 aquifer well, but Table 7E lists it as an A1 aquifer well. Please compare Table 7E and Figure 8B and resolve discrepancies in how the aquifers are designated.

Response: Based on cross sections N-N' and O-O' of the final Parcel C Phase III GDGI report (Tetra Tech EM Inc. [Tetra Tech] 2003d), the bedrock surface slopes from the dip tank area toward the northeast. Dense nonaqueous-phase liquid (DNAPL) migrating from the dip tanks downward is expected to follow the dip direction of the bedrock surface, that is, toward the northeast. The location of proposed new well IR25MW60A2 (to the north of the dip tank area) was selected primarily to define the lateral edge of the VOC plume, but the location was also considered appropriate for attempting to define the extent of potential DNAPL along the bedrock surface. The Navy will evaluate the analytical results and the results of the DNAPL monitoring of these two wells before

considering additional wells for DNAPL monitoring. Figures 8A and 8B and Table 7E were checked for discrepancies. The following discrepancies were found and have been corrected in the final SAP. Aquifer designations on Figures 8A and 8B for new proposed well IR25MW60A1 were changed from red stars (denoting lower A-aquifer) to yellow stars (denoting upper A-aquifer). Monitoring well IR25MW62F will not be installed due to its proposed location being within the test cell for the treatability study at RU-C5.

Specific Comments on Parcel D

1. **Comment:** Figure 10, Groundwater Sampling Well Network for Parcel D and Table 7G, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel D: Metals were detected in several wells in the past, but metals analysis is not included for the following wells:

- Well IR71MW04A has had high levels of metals in the past (TtEMI, Parcel D, 2001 and 2002)
- Cadmium in wells IR44MW08A and IR67MW04A (TtEMI, Parcel D, 2001 and 2002)
- Chromium was found in well IR22MW20A (TtEMI, Parcel D, 2001 and 2002)

Please explain why these wells are not being analyzed for metals or revise the SAP to include metals analysis for these wells.

EPA Clarification: It appears that the words "in the vicinity of" were omitted before "IR71MW04A." Zinc has been detected at high concentrations in two grab groundwater samples from the IR-71 vicinity (IR71B010 and IR22B027). The maximum concentration of zinc was 1130 ug/L, compared to the aquatic criterion of 81 ug/L. The source of the zinc has not been determined, so it would be helpful to analyze samples from IR71MW04A for metals. It is also unclear why analysis for PCBs is not being done for this well, since it is downgradient of building 441 and upgradient of IR71B011, where PCBs have been detected at more than ten times the aquatic criterion.

Response: Regarding the first bullet of the comment (and the EPA clarification of the bullet text), the Navy has proposed new well IR71MW04A to help define the IR-71 VOC plume only. This well is not intended to serve any other purpose and will only be sampled for VOCs.

Although zinc concentrations greater than the aquatic criterion have never been detected in a monitoring well from the IR-71 plume area, the Navy will sample well PA50MW07A as a zinc-monitoring location within the IR-71 plume. PA50MW07A is located downgradient from the two grab locations where zinc had exceeded the aquatic criterion. The Navy's

strategy for sampling metals in groundwater is to sample for metals along the shoreline, where artificial fill is typically found and at areas where there is potential for an industrial source. This strategy will help prevent monitoring for metals that are present due to dissolution of naturally occurring aquifer material. PA50MW07A is closer to shore than both wells IR71MW03A and IR71MW04A. Table 7G has been revised to propose metals sampling at PA50MW07A.

Regarding the second bullet of the comment, cadmium was detected in wells IR44MW08A and IR67MW04A in 1995 at 24.9 and 5.7 µg/L, respectively. In two subsequent samples from each well, collected in January and February 1996, cadmium either was not detected or was not detected above evaluation criteria. The Navy selects wells for metals sampling if metals in the wells have been detected significantly above HGALs (plus 20 percent) in at least three samples over wet and dry seasons. Because neither of these wells meets the criteria, no additional sampling for cadmium is planned for these wells.

Regarding the third bullet of the comment, chromium was detected in well IR22MW20A in October 1994. Chromium was not detected in four subsequent samples; however, chromium was collected in January 1996, February 1996, January 2001, and June 2002. As a result, this well does not meet the selection criteria for metals sampling during the BGMP.

2. **Comment:** **Figure 10, Groundwater Sampling Well Network for Parcel D: Cyanide was found in wells IR22MW16A and IR22MW20A in the past (TtEMI, Parcel D, 2001 and 2002), but this sampling plan does not include analysis for cyanide. Please explain the exclusion or revise the plan to include these wells in cyanide analysis.**

Response: Cyanide concentrations in the four IR-22 monitoring wells, including IR22MW16A and IR22MW20A, have not exceeded the maximum contaminant level (MCL) or the aquatic criterion and are not considered to warrant further sampling.

3. **Comment:** **Figure 10, Groundwater Sampling Well Network for Parcel D: Semi-volatile organic compounds (SVOCs), PCBs, and pesticides were detected in western Parcel D monitoring wells and Aroclor-1260 was detected in southern Parcel D monitoring wells (TtEMI, Parcel D, 2001 and 2002), but monitoring for these analytes is not included. Please explain this omission and consider monitoring wells in western and southern Parcel D for these contaminants.**

Response: Acenaphthalene, benzo(a)pyrene, bis(2-ethylhexyl)phthalate, hexachloroethane, and Aroclor-1260 exceeded GDGI criteria at one or more Parcel D wells. These wells were considered for monitoring, but none of these locations met BGMP selection criteria for additional sampling (three detections in wet and dry seasons). No pesticide concentrations exceeded GDGI evaluation criteria or BGMP selection criteria at any Parcel D well.

Specific Comments on Parcel E

Northwest Bay Fill Area

1. **Comment:** Section 7.2, Northwest Bay Fill Area, Page 43 and Figure 12, Groundwater Sampling Well Network for the Northwest Bay Fill Area Parcel E: The monitoring wells in the radium dial disposal area will be destroyed during the proposed removal action, but this is not discussed in Section 7.2. Please discuss this issue, and estimate the number of rounds of groundwater monitoring that will be completed before the wells are destroyed. When they are replaced, please include additional wells in the southern half of IR-02 Northwest, so that potential discharge of contaminants into the Bay can be monitored.

Response: The proposed excavation area to be outlined in the upcoming removal action work plan includes four monitoring wells from the Northwest Bay Fill Area, three of which are included in the draft SAP. The removal action is anticipated to occur during summer 2004. Groundwater samples will be collected during the second quarter 2004 before the wells are decommissioned. Future decommissioning of monitoring wells and a schedule for their replacement will be addressed in conjunction with the removal action work. The disposition of these wells will also be discussed in reports associated with the BGMP.

2. **Comment:** Figure 12, Groundwater Sampling Well Network for the Northwest Bay Fill Area Parcel E: Barium, copper, nickel, lead, and zinc were all found in elevated concentrations over the Northwest Bay Fill Area in the past (TtEMI, Parcel E, 2003), but a complete metals analysis is only included for half the wells in the current sampling plan. Please explain why all of the wells are not being analyzed for metals or include metals analysis of all wells.

Response: In the A-aquifer, metals pose a potential risk only to receptors in the Bay. Consequently, in the Northwest Bay Fill Area, the Navy selected five monitoring wells along the shoreline for metals analysis. In Table H-9, the Navy identified inland wells that may be sampled in the future for metals.

Former Oil Reclamation Ponds Area

1. **Comment:** **Figure 13, Groundwater Sampling Well Network for the Oil Reclamation Ponds Area Parcel E: Groundwater flows away from the shoreline and sheet pile wall according to the figure, but the majority (all but two) of the monitoring wells are located on the seaward side of the LNAPL plume. Please consider installing additional monitoring wells north of the oil ponds to track downgradient contaminant movement.**

Response: In the draft SAP, the Navy proposed limited monitoring of the Former Oil Reclamation Ponds Area because the Navy expects this area to be the subject of extensive additional study under other programs, including the TPH program and various treatability studies. Additional monitoring will be conducted to collect data needed for those studies (including monitoring of LNAPL and DNAPL), and each of the studies will specify its own monitoring requirements. The Navy has limited proposed monitoring in this area in the draft SAP to avoid duplication of efforts.

2. **Comment;** **Figure 13, Groundwater Sampling Well Network for the Oil Reclamation Ponds Area Parcel E: TPH was found over much of the Oil Reclamation Ponds Area in the past (TtEMI, Parcel E, 2003) but is only included in about half the well analyses in this sampling plan. Please explain why half the wells are not being tested for TPH.**

Response: The selected wells not planned for TPH analysis (IR02MWB-1, IR03MW224A, IR03MW228B, and IR03MW342A) did not meet the selection criteria for TPH monitoring. As explained in note "d" of Table 7K, TPH concentrations will not be analyzed in samples collected from locations outside of VOC plumes, at redundant VOC plume monitoring locations, or where TPH concentrations are below TPH program criteria (Figure 6-2 of the final Phase III GDGI groundwater summary report for Parcel E [Tetra Tech 2003e]). Although several other wells in the former Oil Reclamation Ponds area also meet monitoring selection criteria for TPH in the draft SAP, they will not be sampled because of the presence of LNAPL.

3. **Comment:** **Table 7K, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel E, Oil Reclamation Ponds Area and Figure 13, Groundwater Sampling Well Network for the Oil Reclamation Ponds Area, Parcel E: Total metals and PAHs are not included in the analytical suite proposed for IR03MW218A2. Samples collected from this well are proposed to be analyzed for zinc, hexavalent chromium, VOCs, 1,4-Dioxane, and polychlorinated biphenyls (PCBs). However, the text on page 6-16 of the Parcel E Groundwater Summary Report,**

Phase III Groundwater Data Gaps Investigation (TtEMI 2003c) indicates that 2-methylnaphthalene, a PAH, was detected above its aquatic criterion in 2002. Also, at nearby monitoring well IR03MW218A3 barium, nickel, and antimony were detected above evaluation criteria in 2002. In order to adequately characterize the groundwater beneath the oil reclamation ponds area, please include total metals and PAHs in the analytical suite for IR03MW218A2.

Response: Table 7K indicates that IR03MW218A2 will be analyzed for SVOCs; 2-methylnaphthalene is included in the SVOC suite of analytes. Regarding metals detected in IR03MW218A3, only barium meets the draft BGMP selection criteria in this well (Table G-1 of the Phase III GDGI report for Parcel E [Tetra Tech 2003e]). Barium also meets the draft BGMP selection criteria for well IR03MW218A2. As requested, total metals suite will be added for well IR03MW218A2 in Table 7K.

4. **Comment:** Table 7K, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel E, Oil Reclamation Ponds Area and Figure 13, Groundwater Sampling Well Network for the Oil Reclamation Ponds Area, Parcel E: Monitoring well IR03MW224A is not proposed for metals monitoring. Barium and copper were detected at IR03MW342A which is located upgradient of IR03MW224A. Also, IR03MW224A appears to be the only downgradient well at the oil reclamation ponds area. Please include metals in the analytical suite proposed for this well.

Response: IR03MW224A has been sampled several times for metals; the last time was in 2002. Barium has not been detected above HGAL in the last three sampling rounds, and copper has not been detected during the last three sampling rounds. The Navy does not believe that this well warrants additional sampling for metals at this time. IR03MW224A will be sampled for PCBs during the BGMP (Table 7K). TPH is addressed under a separate program at HPS unless it is commingled with a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) contaminant. Well IR03MW224A will not be sampled for TPH because it is outside the boundary of the VOC plume (note "d" of Table 7K for explanation).

5. **Comment:** Table 7K, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel E, Oil Reclamation Ponds Area and Figure 13, Groundwater Sampling Well Network for the Oil Reclamation Ponds Area, Parcel E: Table 7K and Figure 13 do not include a discussion of DNAPL. According to the Groundwater Summary Report (TtEMI, Parcel E, 2003), if DNAPL is present, a potential migration pathway may be present along the surface of the Bay Mud toward the

northeast into the Bay Mud depression. The groundwater summary report further indicates that DNAPL may be present, but additional investigation at the Oil Ponds Area is needed to confirm this. Table 7K does not confirm that this investigation is a part of the Basewide groundwater monitoring program. Please explain where and how further investigation of DNAPL at this site will be completed if this site is not accepted into the National Environmental Technology Test Sites Program.

Response: Please see the response to EPA specific comment 1 on the Former Oil Reclamation Ponds Area.

Other Areas Northwest

1. **Comment:** Table 7L, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel E, Other Areas Northwest and Figure 14, Groundwater Sampling Well Network for the Other Areas Northwest Parcel E: TPH was detected in well IR12MW21A in the past (TtEMI, Parcel E, 2003), but TPH analysis was not proposed for this well. Please explain this exclusion or include TPH analysis for this well.

Response: TPH analysis was not proposed for IR12MW12A because the most recent (2002) total TPH concentration from that well did not exceed the TPH criterion of 20,000 µg/L for monitoring wells located more than 250 feet from the Bay (Tetra Tech 2001a).

2. **Comment:** Table 7L, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel E, Other Areas Northwest and Figure 14, Groundwater Sampling Well Network for the Other Areas Northwest, Parcel E: Table 7L indicates that, well IR05MW85A will be monitored for mercury, but metals were detected above criterion in other wells, so it is not clear why samples from other wells will not be analyzed for metals. According to Figure 7-2 of the Groundwater Summary Report (TtEMI, Parcel E, 2003) metals were detected above their respective criterion at PA36MW04A (copper), IR12MW18A (nickel), PA36MW03A (copper and zinc), IR12MW21A (barium), IR04MW36A (arsenic), and IR01MW09B (copper). Please include the following list as part of the Basewide groundwater monitoring program:

- Analyze for copper at IR01MW09B
- Analyze for barium at IR12MW21A
- Analyze for nickel at IR12MW18A
- Analyze for copper and zinc at PA36MW03A
- Analyze for arsenic at IR04MW36A

Response: Copper concentrations at well IR01MW09B have exceeded the aquatic criterion within the three most recent rounds of sampling. (Because this is a B-aquifer well, the HGALs do not apply.) Table 7L has been revised to indicate that IR01MW09B will be sampled for copper.

Barium concentrations at well IR12MW21A have exceeded the HGAL by 20 percent within the three most recent rounds of sampling. Table 7L has been revised to indicate that IR12MW21A will be sampled for barium.

At well IR12MW18A, nickel has been detected consistently at concentrations exceeding the HGAL. The Navy believes additional nickel data are unnecessary for this well. The rationale column for IR12MW18A in Table H-11 indicates sufficient nickel data for the revised feasibility study (FS).

Table H-11 indicates that well PA36MW03A may be monitored in the future for copper and zinc and that well IR04MW36A may be monitored in the future for arsenic. The Navy may sample PA36MW03A and IR04MW36A for copper/zinc and arsenic in the future.

Additionally, the footnote "a" in all of the Section 7.0 and Appendix H tables has been changed from "Metals have not been significantly above HGALs (+20 percent) in at least three samples over the wet and dry seasons" to "Metals have not been detected significantly above HGALs (+20 percent) in at least three of the most recent samples over the wet and dry seasons." The revised text accurately represents the rationale used for evaluating A-aquifer metals data.

3. **Comment:** Table 7L, Proposed Groundwater Sampling Locations, Analyses, and Rationale for Parcel E, Other Areas Northwest and Figure 14, Groundwater Sampling Well Network for the Other Areas Northwest, Parcel E: No wells are proposed to monitor the potential migration of VOCs from the Landfill Area onto the Other Areas Northwest. According to Figure 7-3 of the Groundwater Summary Report (TtEMI, Parcel E, 2003) three landfill wells (IR12MW17A, IR12MW19A, and IR04MW13A) that are adjacent to the Other Areas Northwest contained concentrations of VOCs that exceeded criterion in 2002. Also, IR12MW14A was sampled in June 2002; 1,4-DCB and PCE were both detected above their criterion during this sampling event. Please include IR12MW14A in the Basewide groundwater monitoring program and analyze samples collected from this well for VOCs in order to monitor VOC migration from the Landfill Area and to further investigate the elevated concentrations of VOCs at this well. In addition, please consider including other monitoring wells to evaluate potential migration of VOCs from the Landfill Area into Other Areas Northwest.

Response: Figure 11 shows that well IR12MW17A is selected for sampling, however, this information did not appear in Table 7H in the draft BGMP. IR12MW17A has been added to Table 7H. The Navy may sample IR12MW19A and IR04MW13A for VOCs in the future. Based on EPA's comment, the Navy has reconsidered well IR12MW14A and has added it to the sampling program. (In the final SAP, IR12MW14A is indicated as selected for sampling on Figure 14, was added to Table 7L, and was removed from Table H-11.) IR12MW19A was incorrectly identified in Table H-8 as a redundant landfill monitoring well. Table H-8 has been modified in the final SAP to indicate that IR12MW19A may be sampled in the future.

Other Areas Southeast

1. **Comment:** Figure 15, Groundwater Sampling Well Network for the Other Areas Southeast Parcel E: Metal contamination appears to have been of concern in these areas in the past (TtEMI, Parcel E, 2003), but metals analysis is only included in half the wells in this sampling plan. Please justify only testing half the wells in this area for metals.

Also, monitoring well IR39MW33A is not included in the Basewide groundwater monitoring program to monitor for barium. Concentrations of barium as high as 4,240 ug/L were detected at this location from 1996-2002. No other wells in this area are proposed to monitor for metals. Therefore, please include IR39MW33A in the Basewide groundwater monitoring program and analyze samples collected from it for barium.

Response: Explanations for sampling or not sampling monitoring wells in the Other Areas Southeast for metals are provided either as footnotes in the metals columns or as explanations in the rationale columns of Tables 7M and H-12. The Navy will sample IR39MW33A for barium, as recommended in the comment. Figure 15 and Tables 7M and H-12 have been revised accordingly.

2. **Comment:** Figure 15, Groundwater Sampling Well Network for the Other Areas Southeast Parcel E: TPH was detected in well IR15MW08A in the past at levels exceeding criteria (TtEMI, Parcel E, 2003), but this well is not included in the current sampling plan nor is nearby well IR15MW06A being tested for TPH. Please consider TPH analysis for well IR15MW06A in light of the historical contamination found in IR15MW08A.

Response: TPH at well IR15MW08A has not exceeded criteria in four samples collected since 1992 and, as is pointed out in Table H-12, there are no CERCLA contaminants associated with this well. TPH concentrations at IR15MW06A have never exceeded criteria. Neither of these wells will be sampled for TPH. The rationale column for IR15MW08A in Table H-12 has been revised to include the statement that TPH has not been detected above criteria in four samples collected since 1992.

Specific Comments on Appendix G

1. **Comment:** **Figure G-1, A-Aquifer Wells Selected for Groundwater Level Measurements: The groundwater elevations are not posted on the map. These need to be included so that the groundwater contouring can be verified and so that the objectives of this part of the study can be checked. Please post the groundwater elevations on this map.**

Response: Groundwater elevations for A-aquifer monitoring wells from February 20, 2002, are provided on Figure 3. Also shown on Figure 3 are the same groundwater elevation contours shown on Figure G-1.

2. **Comment:** **Figure G-1, A-Aquifer Wells Selected for Groundwater Level Measurements: Blocking off sewer lines will impact groundwater flow, but it does not appear that this was considered when wells were selected for water level monitoring. Please include the location of the sewer lines that have been or that will be blocked off on Figure G-1 and evaluate whether additional wells should be selected for water level monitoring to ensure that changes in the groundwater flow direction are monitored.**

Response: Groundwater level measurements will be collected on a quarterly basis, allowing for timely recognition of possible groundwater flow pattern changes. The Navy, over the course of the GDGI, has obtained groundwater elevation measurements at numerous monitoring locations adjacent to utility lines and has established an adequate understanding of groundwater flow patterns at HPS that accounts for utility line effects. The Navy believes that the monitoring well network proposed in the draft SAP is adequate to detect future changes to the current flow patterns because of altered utility lines. Section 1.6.4, "Reports Generated," indicates that both quarterly and annual monitoring reports may include recommendations for improvements to the monitoring plan.

3. **Comment:** **Figure G-1, A-Aquifer Wells Selected for Groundwater Level Measurements:** There is a groundwater flow arrow near IR02P97AB that has no directional head on it. Also, there are numerous wells that are not labeled (e.g., the 4 symbols for "A-aquifer Wells Added to SAP Since the Phase III GDGI" in the southwestern part of IR-01). Please revise the figure so that the arrowhead is visible and provide well identifiers for all monitoring wells and piezometers.

Response: The arrowhead for the flow arrow near IR02P97AB was obscured by well symbols. The arrow has been slightly extended so that the arrowhead is no longer obscured by other map symbols. The unlabeled symbols for four A-aquifer well(s) added to the BGMP since the Phase III GDGI in southwestern Parcel E were labeled on the compact disc (CD) version of Figure G-1. The four wells are IR01MW400A, IR01MW402A, IR01MWI-7, and IR01MWI-8. The hardcopy version of Figure G-1 in the draft SAP did not contain labels for numerous wells, and the figure has been corrected.

4. **Comment:** **Figure G-1, A-Aquifer Wells Selected for Groundwater Level Measurements:** Water levels will not be collected near Building 381 in Parcel D. If there are any monitoring wells in this area, please include one or more for groundwater level measurements.

Response: Figure G-1 shows all existing A-aquifer wells. All the existing wells around Building 381 were selected for groundwater level measurements. These include IR55MW01A, IR55MW02A, IR55MW04A, IR50MW15A, and PA32MW04A, the nearest wells to Building 381 in all directions. No other monitoring wells are in the immediate vicinity of Building 381.

5. **Comment:** **Figure G-1, A-Aquifer Wells Selected for Groundwater Level Measurements:** Parcel E has inferred contours along the shoreline in the western part of the parcel and an extremely steep gradient along the shoreline in eastern Parcel E. Groundwater level measurements in additional wells along the shoreline would better define the groundwater data and help to fulfill the objectives of section 8.3.3. Please consider adding wells in the vicinity of the shoreline if there are additional wells in these areas.

Response: Figure G-1 shows all existing A-aquifer wells. All the existing wells along the Parcel E shoreline have been selected for groundwater level measurement. The existing wells define a steep gradient near the shore, and this gradient has been confirmed by a tidal influence study conducted during Phase III of the GDGI. Additional wells are not necessary to further define the potentiometric surface along the shoreline.

6. **Comment:** **Figure G-1, A-Aquifer Wells Selected for Groundwater Level Measurements:** There appears to be a lack of data southwest of IR01MW31A where the contours become dashed. If there are any additional monitoring wells in this area, please consider adding them to the water level measurements program.

Response: Figure G-1 shows all existing A-aquifer wells. Monitoring well IR01MW402A, not included in previous groundwater level measurement programs, is included in the BGMP groundwater level measurement program. The additional data will verify groundwater contour patterns southwest of well IR01MW31A in the area where contours are dashed on Figure G-1.

7. **Comment:** **Figure G-2, B-Aquifer and Bedrock Water-Bearing Zone Wells Selected for Groundwater Level Measurements:** No wells are shown on the map in Parcels B, D, and E, but there are contours for Parcels D and E. Please include the wells that were used as the basis for these contours.

Response: The Navy inadvertently issued an incomplete hardcopy of Figure G-2 with the draft SAP. A complete draft version of Figure G-2 was issued on the CD that accompanied the draft BGMP. Figure G-2 has been revised, and replacement copies were issued on February 16, 2004. Hardcopy and electronic files provided with the final SAP are consistent with one another. Well symbols and labels not previously shown have been added to Figure G-2.

The contour lines for B-aquifer groundwater elevations across Parcels D and E are based on Figure 3-13 from the Parcel E Phase III GDGI summary report (Tetra Tech 2003e). The B-aquifer groundwater elevations measured at individual wells are shown on that figure.

8. **Comment:** **Figure G-2, B-Aquifer and Bedrock Water-Bearing Zone Wells Selected for Groundwater Level Measurements:** There are well identification numbers on the figure that are not associated with well symbols. Please ensure that each well name is associated with a well symbol and vice versa.

Response: Please see the Navy's response to EPA specific comment 7 on Appendix G.

9. **Comment:** **Table G-1, Wells Selected for Groundwater Level Measurement and Figure G-2, B-Aquifer and Bedrock Water-Bearing Zone Wells Selected for Groundwater Level Measurements:** : Most of the B-Aquifer and Bedrock wells that are selected for measurement are not

included on Figure G-2. As a result, it is not possible to review whether sufficient wells proposed for groundwater level measurements. Please include all B-aquifer and Bedrock wells on this figure and highlight the ones that are proposed for water level measurements. The B-aquifer and Bedrock wells proposed for groundwater level measurements will be reviewed when the revised document is addressed, so additional comments may be made at that time.

Response: Please see the Navy's response to EPA specific comment 7 on Appendix G.

RESPONSES TO COMMENTS FROM ARC ECOLOGY

General Comments

- Comment:** Bedrock water-bearing zone characterization: Based on the information provided in this document, it is not clear that the Navy has sufficiently sampled and characterized the water-bearing zone (WBZ) of the bedrock across Hunters Point Shipyard. Individual fractures or fracture zones may provide conduits for contaminant migration within the Shipyard, from the Shipyard to San Francisco Bay, and/or from the Shipyard to non-Navy property. Please revise the parcel-specific groundwater sampling designs for each parcel and for each remedial unit to specifically address the issue of characterization of possible contamination in the bedrock, either modifying the sampling and analysis plan to better characterize the bedrock or explaining the rationale for why no additional characterization is needed, citing the specific data sources and investigations to support that rationale.

Response: The Navy believes that with the existing data and with the new data that will be collected under the proposed BGMP, the characterization of the bedrock WBZ at HPS is sufficient to proceed with the revised FSs. The Navy wishes to clarify that the necessity of characterizing the bedrock WBZ in a given area at HPS depends on several factors including proximity to an industrial source of contamination, surface depth of the bedrock, and hydrostratigraphic layers (such as Bay Mud) that may serve to inhibit downward contaminant migration. If future investigations suggest that the vertical extent of contamination is not adequately defined, the Navy will evaluate the need for additional characterization including, as appropriate, the bedrock WBZ. Hydrogeological conceptual site models have been developed and presented in the Phase III GDGI reports (Tetra Tech 2003a, 2003b, 2003d, 2003e). New bedrock data acquired

under the BGMP will be used to update the current hydrogeological conceptual models.

2. **Comment:** **Bedrock monitoring wells and cross-contamination:** Open boreholes completed in bedrock have the potential to create pathways between fracture zones not otherwise connected, thus creating opportunities for contaminant migration to fractures or fracture zones not previously contaminated. In cases of wells already completed in bedrock and proposed wells to be completed in bedrock, please explain how the Navy is either determining that there is no potential for cross-contamination within an open well or preventing cross-contamination where ambient flow exists.

Response: No wells will be constructed as open boreholes. The Navy is not aware of any existing wells at HPS that are completed as open boreholes in bedrock and that have not been constructed with casing and bentonite seals. The Navy will follow standard drilling procedures to prevent potential cross-contamination between aquifer zones.

3. **Comment:** **Beneficial use of drinking water exemption:** In Section 1.1.8 *Technical or Regulatory Standards* and Section 2.4 *Groundwater Beneficial Use*, the Navy states that the A-aquifer has been exempted from the beneficial use of drinking water. The Navy also states that the B-aquifer and bedrock WBZ are considered potentially suitable as municipal or domestic water supplies and the most stringent of federal or state primary maximum contaminant levels for drinking water will be used as evaluation criteria for these zones. However, in Section 1.3.2.6 *Detection and Quantitation Limits*, the Navy states, "RWQCB has determined that groundwater at HPS has no beneficial use as drinking water (RWQCB 2003)." The Regional Water Quality Control Board letter to the U.S. Navy dated September 25, 2003, and cited in Section 1.3.2.6 only addresses an exemption for Aquifer A. Please confirm that as of the date of this document, only Aquifer A (and not all groundwater) at Hunters Point Shipyard has received an exemption from beneficial use as drinking water requirements and correct the report text as necessary.

Response: As of the date of the draft SAP (December 18, 2003), only the A-aquifer has been determined to have no beneficial use as a drinking water source. The text in the third paragraph of Section 1.3.2.6 has been revised to state that the RWQCB determination only applies to the A-aquifer.

4. **Comment:** Groundwater level measurement: It is not clear at which wells the Navy will be measuring groundwater levels on a quarterly basis. On page 6 the Navy states that it will monitor water levels in 326 wells. On page 27 in Section 3.4 *Groundwater Levels*, the Navy states that water level measurements will be made in "a total of 366 wells" but cites the list of wells in Table G-1, which lists 414 wells. Table 3C states, "The Navy will conduct quarterly groundwater level measurements at 346 existing and new A-aquifer, 39 existing and new B-aquifer, and 27 existing and new bedrock water-bearing zone wells at HPS," which is a total of 412 wells. Please clarify the number of wells where quarterly groundwater levels will be measured, and specify at which wells these measurements will be made. Please make any corrections necessary to the text and tables to address these discrepancies.

Response: The discrepancies identified in the comment have been reconciled in Table 3C; Appendix G, and text sections indicating the number and types of wells to be included.

5. **Comment:** Sanitary sewer system impact on groundwater flow: The document repeatedly refers to groundwater flow patterns interpreted to be a result of water removal by pumping of the sanitary sewer system with ruptured lines below the groundwater table at Hunters Point Shipyard. Therefore, the Navy can reasonably expect that if pumping patterns change significantly, groundwater flow and thus contaminant migration patterns may change significantly. The Environmental Protection Agency states in its February 2, 2004, comment letter to the Navy about this document that some of these sanitary sewer lines are being blocked off. Please explain, and address in the text of the document, how the Navy will monitor for planned and unplanned changes in these pumping rates and patterns, how the Navy will determine resultant changes in groundwater flow patterns, and how the Navy will identify and respond to any needed changes in the groundwater monitoring plan in a timely manner.

Response: Please see the Navy's response to EPA specific comment 3.

6. **Comment:** Seasonality of results: In Section 3.2 *Isolated Detections of Organic Chemicals and Hexavalent Chromium* and Section 3.3 *Isolated Elevated Metals Concentrations*, the Navy states that it only requires one result from the dry season and one result from the wet season to evaluate potential seasonal effects on isolated detections of chemicals of concern. This is not sufficient for identifying seasonal trends and differentiating between seasonal variations versus anomalous detections that may be attributed to other causes. The Navy would

need a minimum of two to three samples in the wet season and two to three samples in the dry season to be able to begin to identify possible seasonal trends or changes. The proposed criteria for evaluation of isolated detections should be revised accordingly.

Response: Please see the Navy's response to EPA specific comment 4.

7. **Comment:** Isolated elevated metals concentrations: In Section 3.3 *Isolated Elevated Metals Concentrations*, the Navy states, "In general, a metal was selected for analysis only if an industrial source for the metal could be identified." This approach assumes that the Navy has comprehensively identified all possible sources of high metal concentrations and all possible pathways for subsurface migration of these metals. Given that the Navy has repeatedly encountered higher concentrations of chemicals of concern than expected and that the Navy has continued to identify additional sources of contamination, these do not seem to be reasonable assumptions, and lack of a known industrial source is not a reasonable justification for not sampling for and investigating elevated metal concentrations.

Response: The potential for industrial contamination in areas that received industrial debris as fill material, such as IR-07 and IR-18 in Parcel B and most of Parcel E is understood. The Navy's approach for monitoring metals in these locations is to sample primarily along the shoreline. Other areas at HPS have had a preliminary assessment and site investigation, and most have had remedial investigations that provide a sufficient analysis of potential industrial sources of contamination. The Navy will continue to monitor for chemicals of concern identified in groundwater as a result of past industrial operations at HPS. Any additional source areas that may be identified in the future will be addressed at the time of discovery.

8. **Comment:** Groundwater sampling locations: On the tables for *Proposed Groundwater Sampling Locations, Analyses, and Rationale*, it is unclear how the Navy is using the labels "upgradient edge," "leading edge," or "lateral edge" of plume, and "within" or "beneath" plume. It is unclear how an individual well (e.g., IR28MW399B, IR28MW173B, and IR28MW255F) can be sampled both within and below a plume, for example, unless the Navy is doing discrete zone monitoring and sampling within a well or using a multilevel sampler, or how an individual well (e.g., IR28MW315A, IR28MW315B, and IR28MW315F) can be both at the leading edge and the lateral edge of an individual plume. Please better define the plume relationship labels used as part of the rationale. Please also explain, either in the associated text or within the table, what criteria are used to define the boundaries of the plumes being referenced.

Response: The terms “upgradient edge,” “leading edge,” and “lateral edge” are used for wells considered to be near the edge of a plume. Such wells may be inside or outside of the plume. The term “within plume” is used for wells that are inside the plume but are not considered to be near the edge of the plume. The term “beneath plume” is used for wells that are considered to be screened at depth below the lowest vertical extent of the plume. Section 3.1 has been revised to provide a more complete explanation of the plume relationship terminology used in the draft BGMP. The Section 7.0 and Appendix H tables have been revised to remove conflicting plume relationships.

9. **Comment:** **Impact of removal actions on Groundwater Monitoring Program: The Navy currently has plans for removal actions and/or treatability studies at various sites across the Shipyard. What wells included in the Groundwater Monitoring Program will be affected by these plans? If any of the wells will be affected, please explain how the Navy plans to revise the sampling and analysis plan to address these issues.**

Response: The Navy will decommission wells on an as-needed basis in areas where planned time-critical removal actions (TCRA) or treatability studies are in progress. Wells currently planned for decommissioning are identified in the Appendix H tables. If decommissioning of a monitoring well selected for sampling under the BGMP becomes necessary, replacement of that well will be evaluated. A replacement well will be installed based on a continuing need to obtain data from that location. If at the time of decommissioning, the data from the decommissioned well are deemed sufficient for remedial action decisions, the well may not be replaced. The results of the Navy’s analysis will be provided in ongoing reports associated with the BGMP.

Specific Comments

RU-C1

1. **Comment:** **How has the southern edge of the RU-C1 (Figure 5) been delineated, given that there are no wells for 180 feet south of this boundary, as shown?**

Response: The southern edge of the VOC plume at RU-C1 has been delineated by wells that have consistently shown either low VOC concentrations (less than 1 µg/L) or where VOCs have not been detected (with reporting limits of 1 µg/L or less). Monitoring wells PA50MW03A and IR28MW171A beyond the southern edge of the plume will be sampled in this program. If future monitoring data show an increase in VOC concentrations at these wells, the Navy will consider installing additional wells to redefine the edge of the plume.

2. **Comment:** All wells shown on Figure 5 are delineated as within the area of VOC contamination, except for IR28MW171B and IR28MW171A. How is the Navy monitoring for changes in the leading edge of the plume and possible discharge into the San Francisco Bay?

Response: Please see the Navy's response to EPA specific comment 1 on RU-C1. Regarding possible discharges of groundwater contamination to the Bay, the Navy intends to monitor VOC plume extent based on the detection limit where practical. Additional monitoring wells nearer to the Bay will be evaluated.

RU-C4

1. **Comment:** The rationales for TPH sampling in IR2828MW201F and IR28MW211F are not given in Table 7D. Please adjust text in table as needed.

Response: The specification of TPH sampling for these two wells was an error. Neither IR28MW201F nor IR28MW211F will be sampled for TPH because TPH concentrations from both wells were below the Navy's criteria for sampling groundwater for TPH. The maximum detected TPH concentration at IR28MW201F was less than the criterion of 1,400 µg/L (860 µg/L). The maximum detected TPH concentration at IR28MW211F was 16,000 µg/L. However, the well is located more than 250 feet from the Bay, and the criteria at such a distance from the Bay is 20,000 µg/L. Table 7D has been revised to indicate that IR28MW201F and IR28MW211F will not be sampled for TPH. Rationale for why these two wells will not be sampled for TPH has been added to Table 7D.

2. **Comment:** On page 34, the document references changes based on the Phase III Parcel C GDGI report. Figure 7 does not reflect the referenced changes in the conceptual model for groundwater flow direction or the eastern boundary of the plume.

Response: The comment incorrectly states that the text on page 34 of the draft SAP refers to changes based on the Phase III Parcel C GDGI report (Tetra Tech 2003d). The text on page 34 of the draft SAP identifies changes to the recommendations presented in the Phase III Parcel C GDGI report; the changes in the recommendations are based on the results of the zero-valent iron (ZVI) treatability study (Tetra Tech 2003c). The second bullet on page 34 has been revised to indicate that the western component of the overall southeastern groundwater flow direction through the Building 272 area is local. General groundwater flow across southeastern Parcel C and the RU-C4 area is still to the south/southeast towards the Bay, as shown on Figure 3. Also, the last bullet, regarding monitoring well

IR28MW311A, has been deleted. Trichloroethylene (TCE) concentration, at the end of the ZVI treatability study, at IR28MW311A was slightly higher than the detection limit (0.5 µg/L). The area shown as the "approximate area of VOC contamination" on Figure 7 encompasses monitoring well locations where VOCs have been detected and IR28MW311A will continue to be monitored for VOCs.

3. **Comment:** If the groundwater in the A Aquifer is generally flowing to the southwest, how is this edge of the plume and possible migration toward the Bay being monitored? There are no wells indicated between the edge of the plume, as delineated, and the San Francisco Bay.

Response: As is indicated in the response to the previous comment, groundwater generally flows south/southeast across RU-C4. The second bullet on page 34 has been revised to indicate that there is a local and western component to the overall southeastern groundwater flow direction through the Building 272 area. IR28MW272A and the new proposed well IR28MW272F will both be sampled for VOCs at the downgradient edge of the approximate area of VOC contamination. These wells, along with further inland wells IR28MW200A, IR28MW312F, and IR28MW298A, will provide sufficient monitoring of the RU-C4 VOC plume migration southeast towards the Bay. The Navy will evaluate the need for additional wells between IR28MW272A and IR28MW272F and the Bay based on the analytical results for the existing wells.

RU-C5

1. **Comment:** On Page 35, the Navy states that pesticides are known to exist at IR-25 at concentrations exceeding evaluation criteria. If this is the case, what is the Navy's rationale for not sampling any of the IR-25 plume monitoring wells for pesticides?

Response: The pesticides alpha- and gamma-chlordane were detected in 2002 at two out of the four locations sampled for pesticides at RU-C5. Alpha- and gamma-chlordane were found at wells IR06MW42A and IR25MW18A, respectively. IR25MW18A has been decommissioned in preparation for a treatability study. IR06MW42A will be sampled for pesticides, as specified in Table 7A. The 2002 concentration of gamma chlordane in IR25MW18A exceeded evaluation criteria by less than one order of magnitude, and the concentration (0.011 µg/L) is below the reporting limit, indicating that the data are quantitatively unreliable. Well IR06MW54F will also be sampled for pesticides, as specified in the draft SAP in Table 7E.

Parcel C, Other Monitoring Locations

1. **Comment:** Based on the maps provided, IR06MW50F may also be downgradient of IR25. What is the rationale for not sampling this well for VOCs or PCBs?

Response: IR06MW50F was selected under the BGMP for sampling for chromium and hexavalent chromium during quarterly monitoring because these chemicals were previously detected in the well. The Navy considers that IR06MW50F is too far from the currently defined VOC plume edge to warrant sampling for VOCs. For the IR-25 plume, the Navy will consider adding a monitoring well between IR06MW34A and the sump and dip tank area based on the results of the proposed BGMP. The Navy will evaluate the need for this well after the first year of monitoring both contaminant concentrations and groundwater flow directions in this vicinity. Although IR06MW50F may be downgradient of the IR-06 plume, it is located farther downgradient than other wells that can more appropriately define the edge of the plumes. IR25MW40A is selected for sampling for the IR-06 plume and makes analyzing IR06MW50F samples for VOCs unnecessary.

2. **Comment:** If molybdenum has been identified in IR29MW85F at levels above HGALs, what is the rationale for not sampling this well for molybdenum as part of the Groundwater Monitoring Program (BGMP)? If this metal has been identified at levels above HGALs, then it should be sampled for during the BGMP, regardless of whether or not a known source has been identified.

Response: Molybdenum concentrations have exceeded the HGAL by more than 20 percent in each of the three most recent sampling rounds. Table 7F has been revised to indicate that IR29MW85F will be sampled for molybdenum.

Section 6.0, Parcel D Groundwater Sampling Design

1. **Comment:** Please clarify the description of the aquifer system at Parcel D, as described on page 37. The bulleted text states that the aquifer system consists of the A-Aquifer and that the B-Aquifer is part of the A-Aquifer, but the text below differentiates between the A- and B-Aquifers and their relative hydraulic parameters.

Response: The items listed as bullets in Section 6.0 are components of the shallow aquifer system at Parcel D. They are not components of the A-aquifer. The introductory sentence to the bullet list has been revised to read "The aquifer system at Parcel D consists of the following:" and the first two bullet items are identified as components of the A-aquifer.

2. **Comment:** In addition, it would be helpful to the reader to include a basewide map indicating the wells that are part of the proposed Groundwater Monitoring Plan, in addition to the existing localized maps already included in the document.

Response: Figure G-1 is a basewide map showing all A-aquifer wells selected for water level measurement. Figure G-2 is a basewide map showing all B-aquifer and bedrock WBZ wells selected for water level measurement. Although a basewide map for the wells selected for sampling could be helpful, the Navy believes the benefits of such a map are minor. The individual maps present all information necessary to understand the Navy's approach in the draft SAP and for field personnel to execute the sampling activities under the BGMP.

Responses to Additional Comments from Arc Ecology

Additional comments were received on March 2, 2004.

Parcel B Groundwater Sampling Design

1. **Comment:** According to Figure 4 – *Groundwater Sampling Well Network for Parcel B*, no wells along the sea well were selected for groundwater sampling and analyses, although many of them have been selected for groundwater level measurements. Section 2.3 *Groundwater Flow Characteristics* indicates that groundwater flows toward the San Francisco Bay in this area. Data from these wells, therefore, could be used to clarify the question the potential migration of contaminants from Parcel B into San Francisco Bay. What is the rationale for not including any of these wells in the groundwater-sampling plan?

Response: The monitoring well network to be sampled was determined in the RAMP (Tetra Tech 1999). POC wells were located near the inland edge of the tidally influenced zone (TIZ). Any modifications to the RAMP will be discussed with the BCT as part of the 5-year evaluation dictated by the 1997 record of decision (ROD) (Navy 1997). A limited number of "supplemental characterization" monitoring wells were added to the RAMP wells; these wells are identified on Figure 4. Any further modifications to the RAMP will be discussed with the BCT as part of the

5-year evaluation dictated by the October 9, 1997, Parcel B ROD (Navy 1997).

2. **Comment:** According to Table 7A: Proposed Groundwater Sampling Locations, Analyses, and Rational for Parcel B, only groundwater from the A-Aquifer will be sampled in Parcel B. Section 2.5.1 of the Draft Parcel B Shoreline Characterization Technical Memorandum, Hunters Point Shipyard, San Francisco, California, October 3, 2003, states that the A-Aquifer and the bedrock water-bearing zone are present continuously throughout Parcel B and that the B-Aquifer is present in areas of Parcel B. Data from the B-Aquifer and the bedrock water-bearing zone could be used to better characterize groundwater flow characteristics for Parcel B and to better determine the nature and extent of contamination on Parcel B, thus better informing any future decisions to amend the original Record of Decision for this Parcel. What is the rationale for not including any groundwater sampling from the bedrock water-bearing zone or B-Aquifer in the plan? What data does the Navy have to indicate that the contaminants present in the A-Aquifer are not present in the B-Aquifer or in the water-bearing zone of the bedrock on Parcel B?

Response: The monitoring well network to be sampled was determined in the RAMP (Tetra Tech 1999) with limited additional characterization sampling, as described in Navy's response to DTSC Parcel B general comment 1. Any modifications to the RAMP will be discussed with the BCT as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997). Some B-aquifer sampling was performed during the Year 1 of the RAMP; the data was evaluated in the Bay Mud Aquitard Technical Memorandum (Tetra Tech 2001b). Please see the response to DTSC Parcel B general comment 4 for further information regarding the B-aquifer. The Navy looks forward to discussing the B-aquifer at Parcel B with the BCT during preparation of the technical memorandum in support of a ROD amendment (TMSRA) to be submitted in November 2004.

3. **Comment:** Figure 3 – *A-Aquifer Groundwater Elevations* and Figure 4 – *Groundwater Sampling Well Network for Parcel B* indicate that groundwater in the area of IR-07 generally flows to the northeast, towards San Francisco Bay. However, there are no monitoring wells selected between the edge of the indicated nickel plume and the shoreline in order to monitor potential movement of the plume towards the San Francisco Bay.

Response: The Navy disagrees that a nickel plume is present at IR-07. The nickel plume at the IR-07 area has been attributed to groundwater conditions associated with former stainless steel monitoring wells and grab samples. Please refer to the Navy's response to DTSC Parcel B general comment 2d. POC well IR07MW20A1 will be sampled quarterly to evaluate nickel concentrations in this area.

4. **Comment:** **Figure 3 – A-Aquifer Groundwater Elevations does not indicate any wells included in the groundwater sampling plan immediately downgradient of IR-06. What is the rationale for not conducting groundwater sampling downgradient of the 2001 Soil Vapor Extraction treatability study?**

Response: Figure 3 illustrates groundwater elevations measured on February 20, 2002, but does not indicate wells to be sampled as part of the draft BGMP. Figures 8A and 8B show the proposed monitoring network for the RU-C1 area, and Table 7E outlines which wells are proposed for sampling the downgradient or leading edges of the plumes. The soil vapor extraction (SVE) area at the west side of Building 134 is associated with the IR-25 portion of the RU-C5 plume area. Two new proposed wells (IR25MW61A1 and IR25MW61A2) will be sampled downgradient from the SVE area on the west side of Building 134. Monitoring well IR06MW42A is located approximately downgradient from the smaller SVE area in the center of Building 134; this well will be monitored as part of the Parcel B RAMP (Figure 4 and Table 7A).

5. **Comment:** **Figure 3 – A-Aquifer Groundwater Elevations does not indicate any wells included in the groundwater sampling plan immediately downgradient of IR-26, either north in the direction of the shoreline or south toward Dry Dock 3. What is the rationale for not conducting groundwater sampling downgradient of the IR-26?**

Response: Figure 3 illustrates groundwater elevations measured on February 20, 2002, but does not indicate wells to be sampled as part of the draft SAP. Figure 4 shows the proposed monitoring network for Parcel B. At IR-26, the POC monitoring well IR26MW41A and the three supplemental characterization monitoring wells (IR26MW46A, IR26MW47A, and IR26MW48A) are all proposed sampling locations.

RESPONSES TO COMMENTS FROM TREADWELL AND ROLLO

General Comments

1. **Comment:** Wells Not Selected For Monitoring: Certain wells are indicated on the figures simply as “not associated with” a given element. For example, on Figure 11, well IR12MW18A is indicated as “not associated with landfill area” in the legend, but the benzene plume in the area is depicted to extend beyond the subject boundary and this well appears to be ideally suited to serve as a downgradient sentry well for the benzene plume depicted. IR12MW18A is also shown on Figure 14, where the benzene plume is not depicted (but arguably should be), and the well indicated there as “not selected for monitoring.” Table H-11 lists the rationale for not sampling IR12MW18A as “Nickel was consistently detected at concentrations (122 to 205 µg/L) above the HGAL during six sampling rounds between 1992 and 2002. These nickel data are sufficient for the revised FS study. Toluene was detected during the previous three sampling rounds. This well may be monitored in the future for VOCs.” No direct reference is made to the apparent adjacent benzene (VOC) plume. Suggest monitoring well IR12MW18A as an off-area well, such as was done for well IR36MW16A, shown on Figure 14, and annotated on Table 7L. This is just one example. Further detailed review may be warranted.

Response: The Navy agrees that IR12MW18A is a suitable well for monitoring the benzene plume. However, monitoring well IR12MW17A located about 75 feet west of IR12MW18A has been selected to track the leading edge of the benzene plume. If an increasing trend in benzene concentration is detected at IR12MW17A, the Navy will consider monitoring IR12MW18A in the future.

2. **Comment:** Figures: Plumes are shown but no reference is made on figures as to the value used to define the edge of the plume. Suggest indicating what concentration level the line representing the plume boundary intended to represent.

Response: The green stippled areas on the figures show the approximate area of VOC contamination based on all detections of VOCs regardless of concentration, not on a specific concentration.

Specific Comments

1. **Comment:** Figure 4: The legend does not represent all elements shown on the figure. For example, the symbol used to represent “repaired water line” is missing.

Response: The repaired water line symbol has been added to the legend on Figure 4 in the final SAP.

2. **Comment:** Figure 5: It is not clear how the RU-C1 plume boundaries are defined by wells mostly located within the plume, and why sentry wells (outside of the plume) are not located between the plume and the bay, given the indicated groundwater flow directions. Suggest installation of sentry wells between plume and the Bay on the east side of the plume (note that well PA50MW03A is indicated for sampling as a “non-plume well” on Figure 9. Suggest noting that on Figure 5 as is done with other wells in similar cases, such as Figure 6, well IR28MW169A). Note: Table 7F page 3, rationale column, states that PA50MW03A will be sampled to “check the vertical extent of the RU-C1 VOC plume.” Suggest this well symbol should be changed to indicate it as “selected for plume monitoring” on Figure 5.

Response: The VOC plume at RU-C1 has been delineated by wells that have consistently shown either low VOC concentrations (less than 1 µg/L) or where VOCs have not been detected (with reporting limits of 1 µg/L or less). If future monitoring data show an increase in VOC concentrations at these wells, the Navy will consider installing additional wells to redefine the edge of the plume. Regarding possible discharges of groundwater contamination to the Bay, the revised FS will evaluate the potential risk based on the concentrations in the existing wells. If a potential unacceptable risk is identified based on that evaluation, the Navy will evaluate the need for additional wells closer to the Bay.

The Navy agrees to indicate that PA50MW03A is a plume monitoring well. Accordingly, PA50MW03A has been moved from Table 7F to Table 7B, the location symbol for PA50MW03A on Figure 5 has been changed to a large red dot, and the location symbol for PA50MW03A on Figure 9 has been changed to a small gray dot. Additionally, the text in Table 7F for PA50MW03A in the draft SAP, “check the vertical extent of the RU-C1 plume,” was incorrect and has been changed to “check the lateral extent of the RU-C1 plume” in Table 7B in the final SAP.

3. **Comment:** Figure 6: Given the indicated groundwater flow direction, suggest monitoring IR28MW290A, located on the south side of central Building 281, for VOCs. This well would serve as a sentry well should the plume migrate in a downgradient direction. Note that on Figures 6 and 7, this well is indicated as "not associated" with the given element. It is not clear how this well was determined to be not associated with the plume on Figure 6, or any other element, and as such the rational for not sampling this well is not readily found in the BGMP/FSP. Appendix H lists wells not selected for sampling by associated element (plume) with rational, but when a well is simply listed as "not associated," it is not clear by what justification the well is not to be sampled.

Response: IR28MW290A has been decommissioned, as shown on Figure 9 and indicated in Table H-5. Figures 6 and 7 have been revised to show IR28MW290A as a decommissioned well. PCE and TCE were detected at this well during the last sampling round in 1996 at estimated concentrations of 0.3 and 0.2 µg/L. Navy has shown IR28MW290A as not belonging to the RU-C2 plume. Based on the results of the first year of monitoring under the BGMP, the Navy may decide to install a replacement well near the former location of IR28MW290A.

4. **Comment:** Figure 7: It is not clear how the plume boundaries are defined by wells mostly located within the plume, and why sentry wells (outside of the plume) are not located between the plume and the bay, given the indicated groundwater flow directions. Suggest installation of sentry wells outside of southern plume boundary.

Response: Please see the Navy's response to both the EPA's RU-C1 specific comment 1 and the Treadwell and Rollo general comment 2.

5. **Comment:** Figures 8A and 8B: Given the indicated groundwater flow directions, it is unclear why wells IR06MW41A and IR25MW11A are not selected for plume monitoring to serve as sentry wells and/or to confirm the plume boundary in downgradient directions. Table H-4 lists the rational for not sampling IR06MW41A due to the presence of LNAPL (floating free product) in the well. This suggests that the plume boundary depicted on the figure should be reviewed and possibly re-drawn to encompass this well, since benzene, for example, is a VOC. Table H-4 lists the rational for not sampling IR06MW41A as the well is redundant. Given the indicated groundwater flow directions, and the location of this well between two possibly converging plumes, suggest monitoring this well.

Response: The rationale in Table H-4 for not sampling well IR25MW11A is the presence of LNAPL; the IR-25 VOC plumes on Figures 8A and 8B have been revised in the final BGMP to encompass the well. The rationale in Table H-4 for not sampling IR06MW41A is that it is redundant. Downgradient well IR25MW40A was selected as a plume monitoring well (Figures 8A and 8B and Table 7E). In addition, well IR06MW42A was selected for Parcel B RAMP monitoring (Figure 4 and Table 7A). These downgradient wells will be analyzed for VOCs. The Navy believes that these downgradient wells will provide adequate downgradient plume monitoring coverage in this area.

6. **Comment:** **Figure 9:** It appears that not all well symbols are represented in the legend. For example, it appears that the larger well symbols are intended to represent wells selected for sampling, while equivalent smaller symbols are not selected for sampling. If this is the intent, then, for example, the small solid green with black border well symbol is not represented in the legend. This is confusing (as above). At least one other map element is missing from the legend; the symbol used elsewhere to represent a repaired water line (blue circle with crossed lines inside).

Response: The legend for Figure 9 has been revised to include small green circles outlined in black to represent wells screened in the bedrock WBZs that were not selected for monitoring. The Figure 9 legend has also been revised to define the blue circles filled with crossed lines as locations where water line repairs have been conducted. Small yellow circles outlined in black have also been added to the legend as representing lower A-aquifer zone wells not selected for monitoring.

7. **Comment:** **Figure 11:** On what basis is the benzene plume boundary drawn parallel to, and not crossing, the shoreline? Why is well IR12MW19A not selected for monitoring, despite its location as a sentry well at the downgradient extreme of the benzene plume? Table H-8 lists the rational for not sampling this well as "redundant landfill monitoring well." This rational does not appear to be appropriate based on the information available to the reviewer.

Response: The benzene plume boundary is drawn based on professional judgment. Well IR12MW19A was incorrectly identified in Table H-8 as a redundant landfill monitoring well. Table H-8 has been modified in the final SAP to indicate that IR12MW19A may be sampled in the future.

8. **Comment:** Figure 14: See comment below under TABLES, Table 7L. Also, without a more detailed review of data located in other documents, it is not clear why a B-Aquifer well is not proposed for installation adjacent to well IR36MW16A to serve as a downgradient sentry well in the B-Aquifer. If the B-Aquifer is not present in this location, it should be noted on the figure.

Response: Please see the Navy's response below to Treadwell and Rollo's tables comment 1 regarding Table 7L. On Figure 14 in the draft SAP, the groundwater flow arrows do not accurately show the groundwater flow as depicted on Figure 3. According to Figure 3, groundwater flow converges from the west and the east at Building 406. The flow arrows on Figure 14 have been revised in the final BGMP to agree with Figure 3. IR36MW16A is located upgradient of the Building 406 VOC plume. The B-aquifer wells IR36MW120B, IR36MW123B, and IR36MW129B will all be sampled during the BGMP. VOCs were detected in all three of these monitoring wells during 2002, and they will continue to be monitored.

Appendix G

1. **Comment:** Figure G-1: Apparent incorrect double new well symbol at IR28MW221A.

Response: Figure G-1 has been revised to show only one star symbol for well IR28MW221A.

2. **Comment:** Figure G-2: Apparent inappropriate A-Aquifer well tag shown for IR28MW315A. Apparent well tags but no well symbols shown for IR28MW934F4, IR28MW934F5, IR28MW933F4, IR28MW933F5, and IR28MW351F. Suggest either showing the wells which are the basis for the B-Aquifer contour lines shown on the figure, or removing the contour lines.

Response: Figure G-2 has been revised to not show a label for well IR28MW315A. IR28MW315A is shown on Figure G-1 because it is an A-aquifer well. Figure G-2 also has been revised to include well symbols for all B-aquifer and bedrock WBZ monitoring wells. Please see the Navy's response to the EPA's Appendix G specific comment 7.

Tables

- 1. Comment:** Table 7L, Page 1, indicates IR36MW16A is located on the upgradient edge of the plume, but on Figure 14 it appears instead to be located at the leading edge of the plume. Suggest revising Table 7L.

Response: The Navy acknowledges this comment. The Navy has revised Table 7L to indicate that well IR36MW16A is located at the leading edge of the plume.
- 2. Comment:** Table 7F, Page 3, typographical error in rational column “previously” should be “previous.”

Response: The word “previously” has been replaced with the word “previous” in the final SAP.

RESPONSES TO COMMENTS FROM RWQCB

General Comments

- 1. Comment:** Previous comments prepared by Board staff during the past year have stated that the aquatic criteria cited by the Navy are not acceptable to Board staff. Table C-1 should be revised to reflect the aquatic criteria recommended by Board staff.

Response: Please see the Navy’s responses to DTSC Parcel B general comments 6a and 6b.
- 2. Comment:** 1,4-Dioxane analysis is proposed by the Navy at locations where VOCs have been detected. Please provide rationale for why only groundwater in the potential source areas is being analyzed for 1,4-dioxane. Regional Board staff is concerned that 1,2-dioxane may have migrated outside the source area of VOCs for it is soluble in water.

Response: The Navy is aware of the solubility of 1,4-dioxane. In the SAP, one well in each plume was selected under the BGMP to provide initial information on its presence within the plume. The data collected from this effort will be evaluated to assist in establishing the extent of further monitoring for 1,4-dioxane.

3. **Comment:** The subject document does not include a map showing paired shallow and deep wells. In order to facilitate future evaluations of groundwater flow, water levels at all well pairs should be monitored and the locations of these wells should be shown on a map.

Response: Table G-1 and Figures G-1 and G-2 have been revised to include all well pairs for water level measurements.

Specific Comments

Parcel C Groundwater Sampling Design

1. **Comment:** The following additional sampling, analyses, and water level measurements are requested for Remedial Unit C1 (Section 5.1):

a. **PA50MW03A and IR28MW271A:** These wells are located downgradient of the known VOC plume in proximity of San Francisco Bay and should be sampled for VOCs.

Response: With regard to well PA50MW03A, please refer to the Navy's response to the Treadwell and Rollo's specific comment 2. VOCs have not been detected at IR28MW271A above reporting limits of 0.5 µg/L for 20 of the VOCs in the analysis and 4 µg/L for four of the VOCs. However, VOCs were detected in well IR28MW150A, which is located both upgradient from IR28MW271A and at the downgradient edge of the plume. Accordingly, IR28MW150A will be sampled for VOCs to monitor plume migration.

b. **IR28MW125A:** Hexavalent chromium was detected in this well in 2000 and 2001. Therefore, this well should be sampled for hexavalent chromium.

Both Figure 5 and Table 7B indicate that well IR28MW125A has been proposed for sampling. Table 7B indicates that IR28MW125A will be sampled for chromium, hexavalent chromium, and VOCs.

c. **IR28MW126A:** This well is located in close proximity to Dry Dock 2 and in the most recent sampling event (June 2002), the concentration of PCE increased by an order of magnitude and 1,4-DCB was first detected. Therefore, this well should be sampled for VOCs. In addition, copper has exceeded the criteria and should be analyzed for.

The rationale column for IR28MW126A in Table H-1 indicates that while VOCs have been detected in the well, it is a lateral edge plume well and is adjacent to the dry dock, which serves as an impermeable boundary to groundwater contaminant migration. IR28MW125A, as indicated in the previous response to part b of this comment, will be sampled for VOCs, and IR28MW125A is located along the same lateral plume edge at a

location further downgradient from IR28MW126A. Also, well IR28MW268A will be sampled for VOCs and it is located along the same lateral plume edge at a location upgradient from IR28MW126A.

- d. Where contaminants have been historically detected in A-aquifer wells that have been decommissioned, the A-aquifer wells should be replaced. This is of specific concern in the vicinity of B-aquifer well IR28MW309B (VOCs) and bedrock aquifer well IR28MW140F (VOCs, copper, and mercury).**

Neither IR28MW309B nor IR28MW140F have been decommissioned; however, both monitoring wells are located near other wells that have been decommissioned, as shown on Figure 5. IR28MW309B is located slightly southwest of the former location of the decommissioned well IR28MW149A. IR28MW140F is located just north of the former location of the decommissioned well IR28MW124A. Both IR28MW309B and IR28MW140F are proposed sampling locations.

- e. IR28MW314B: This well should be monitored because it is in both the A- and B-aquifer zones and vinyl chloride and cis-1,2-dichloroethene (DCE) were detected during recent monitoring events.**

Well IR28MW314B is considered a redundant VOC plume monitoring location. Two nearby A-aquifer and B-aquifer monitoring wells, IR28MW136A and IR28MW399B, within 50 feet of IR28MW314B are part of the proposed monitoring well network for VOCs, as shown on Figure 5 and in Table 7B. Vertical migration of contamination from the A- to the B-aquifer at RU-C1 has been established and monitoring of the A- and B-aquifer well is not considered necessary.

- 2. Comment: The following additional sampling, analyses, and water level measurements are requested for Remedial Unit C2 (Section 5.2):**

- a. IR28MW172F: This well, screened in the bedrock water-bearing zone, first exhibited VOCs during the most recent sampling event in December 2002. The monitoring program should evaluate the flow path of contaminants towards this well.**

Response: Well IR28MW172F was selected for VOC and TPH monitoring in the BGMP (Figure 6 and Table 7C). In addition, upgradient wells IR28MW299B, IR58MW34A, and IR28MW189F will also be sampled for VOCs and are included in the basewide water level measurement program (Table G-1). This monitoring program is expected to clarify the flow of contaminants toward well IR28MW172F.

- b. IR58MW31A is the only A-aquifer well in the source area to be monitored for VOCs. However, other wells, including IR28MW909A, IR28MW914A, and IR58MW35A, have historically exhibited higher concentrations of VOCs, particularly cis-1,2-DCE. Samples should be collected and analyzed for VOCs from one or more of these additional wells.**

Wells IR28MW909A, IR28MW914A, IR58MW31A, and IR58MW35A are in the source area for the VOC plume at RU-C2. The Navy selected one source-area well (IR58MW31A) for ongoing monitoring because pesticides, PCBs, and TPH have also been detected at this well. Well IR58MW31A will be sampled for pesticides, PCBs, and TPH, as well as VOCs. The three other source area wells listed in the comment are considered to be redundant VOC plume monitoring locations because they are within approximately 20 feet of well IR58MW31A and are screened within the same aquifer. The nature and extent of the VOC plume in this area is considered to be adequately characterized for the FS.

3. **Comment:** The following additional sampling, analyses, and water level measurements are requested for Remedial Unit C4 (Section 5.4):

a. **IR28MW310F and IR28MW402F:** These bedrock wells which have exhibited elevated concentrations of VOCs should be monitored as they are down-dip and to the east of well IR28MW211F in the source area and these wells are situated between the source area and the proposed new well triplet. Well IR28MW402F has been monitored only twice, and the single detection of VOCs should be confirmed by additional sampling. In addition, as there has been demonstrated treatment success using Zero-Valent Iron in the A aquifer, it will be important to collect additional data about the bedrock zone so that an effective remedial option for that zone can be selected.

Response: Both IR28MW310F and IR28MW402F are considered to be redundant VOC plume monitoring locations. The proposed bedrock WBZ monitoring wells IR28MW272F and IR28MW315F and the existing downgradient bedrock water-bearing zone monitoring well IR28MW201F will be sampled for VOCs. IR28MW272F, IR28MW315F, and IR28MW201F are all edge of the plume monitoring locations. These locations will provide adequate data on the VOC plume's impact to groundwater in the bedrock WBZ at locations downgradient from the source area.

b. **IR28MW933F2:** This bedrock well should be monitored as it is down-dip and to the south of the source area, and located between the source area and the proposed new bedrock well, IR28MW272F.

As indicated in Table H-3, IR28MW933F2 is an A-aquifer monitoring well and a redundant VOC plume monitoring location. Several A-aquifer monitoring wells are located downgradient of the source area that will be sampled for VOCs, including IR28MW352A, IR28MW200A, IR28MW312F, IR28MW272A, and IR28MW298A. Please refer to the Navy's response to RWQCB Parcel C Groundwater Sampling Design

specific comment 3a for information on downgradient bedrock WBZ monitoring locations.

- c. **IR28MW272F:** Board staff concurs that the location of this well would be useful, but strongly recommends that the previously proposed bedrock well adjacent to well IR28MW312F also be installed as the plume should be tracked in a progressively down-dip direction to the south.

The previously proposed bedrock WBZ monitoring location adjacent to well IR28MW312F has been replaced by the proposed IR28MW272F, which will be located further downgradient and adjacent to well IR28MW272A.

- 4. **Comment:** The following additional sampling, analyses, and water level measurements are requested for Remedial Unit C5 (Section 5.4):
 - a. It is recommended that an additional lower A-aquifer well be installed to the west of the source area, as the slope of the alluvium/bedrock interface has a slight westward component and it is possible that DNAPL might have moved from the source area in this direction.

Response: Based on cross sections N-N' and O-O' of the final Parcel C Phase III GDGI report (Tetra Tech 2003d), the bedrock surface slopes from the dip tank area toward the northeast. Any DNAPL migrating from the dip tanks would be expected to flow along the dip direction of the bedrock surface toward the northeast. The location of proposed new well IR25MW60A2 (to the north of the dip tank area) was selected primarily to define the lateral edge of the VOC plume, but the location was also considered appropriate to evaluate the presence of DNAPL on the bedrock surface. This well and the seven new wells recently installed for a treatability study near the potential DNAPL source area are considered sufficient to evaluate the presence of DNAPL. The Navy will evaluate the analytical results and the results of the DNAPL monitoring of these wells before considering additional wells for DNAPL monitoring.

- b. **IR25MW55A:** This is a newly proposed well and should be included in the monitoring program.

IR25MW55A is a proposed new treatability study well at RU-C5. Because the treatability study wells will be monitored for the treatability study, they are not included in the BGMP; results from these wells will, however, be evaluated along with BGMP data in the annual report. New proposed well IR25MW60A1, also north of the IR-25 source area, was selected for monitoring during the BGMP. (This well is incorrectly shown on Figures 8A and 8B of the draft SAP as a lower A-aquifer well, but is in

fact intended to be screened in the upper A-aquifer zone. It has been corrected in the revised SAP.)

- c. IR25MW15A2: This well should be sampled as zinc was detected in two of the three most recent sampling events at elevated concentrations.**

IR25MW15A2 has been decommissioned and replaced with other wells in preparation for an upcoming treatability study.

- d. IR25MW11A: Nickel and chromium were detected in the most recent sample of this well. This well should be sampled on a quarterly basis to determine whether nickel and chromium are present at concentrations of concern.**

IR25MW11A was not selected for the BGMP because LNAPL has been detected in the well. This well was erroneously excluded from the groundwater level measurement program where LNAPL measurements will be conducted. This well has been added to Table G-1 and Figure G-1 in the final BGMP. IR25MW11A may be sampled in the future if no LNAPL is found during the groundwater level measurement event.

- 5. Comment: The following additional sampling, analyses, and water level measurements are requested for the Parcel C Nonplume wells (Section 5.5):**

- a. IR58MW25F: Because chromium and hexavalent chromium have been detected consistently above the cited criteria, this well should be sampled for these constituents and an investigation should be conducted to define the lateral and vertical extent of chromium and hexavalent chromium at this location.**

Response: IR58MW25F was selected for monitoring in the draft BGMP (Figure 6 and Table 7C for RU-C2). The well is proposed for chromium, hexavalent chromium, VOC, and TSS monitoring (Table 7C). Vertical and lateral extent of contamination in this area may be delineated if merited, based on results of this sampling.

- b. IR30MW01F: Because this well was sampled one time and molybdenum was detected above the criteria, this well should be sampled to confirm whether molybdenum is present.**

IR30MW01F has been removed from Table H5 and Table 7F has been revised to indicate that IR30MW01F may be added in the future.

- c. IR30MW02F: Because this well was sampled one time and zinc was de[t]ected above the criteria, this well should be sampled to confirm whether zinc is present.**

Zinc was detected in well IR30MW02F at an estimated concentration of 89 µg/L, slightly above the aquatic criterion of 81 µg/L. IR30MW02F may be sampled for zinc in the future.

- d. IR58MW72F: An investigation should be conducted to define the lateral and vertical extent of chromium and hexavalent chromium at this location.**

It is unclear which well is being referred to; no well identified as IR58MW72F exists at HPS. Chromium has been detected in two wells with similar identifications, IR29MW72F and IR58MW25F. Both wells were selected to be monitored for chromium and hexavalent chromium in the draft SAP (Figures 6 and 9 and Tables 7C and 7F).

- e. PA50MW03A: The source and extent of cyanide at this location should be determined.**

This well was selected for cyanide sampling in the draft SAP (Table 7F) to confirm the presence of cyanide in the well. If cyanide continues to be detected in the well, additional investigation of the source and extent of cyanide will be considered.

Parcel E Groundwater Sampling Design

- 6. Comment:** Section 7.1, page 41, 2nd paragraph: The document states that "a grass fire occurred on a portion of the landfill". Previous comments prepared by Board staff (such as our April 16, 2003 comments regarding the "Removal Action Landfill Cap Closeout Report dated February 3, 2003) have asked for clarification and consistency between reports describing the landfill fire.

Response: Section 7.1 has been revised to indicate that the fire at the landfill in 2000 was a subsurface fire rather than a grass fire. (See DTSC Parcel E specific comment 6.)

- 7. Comment:** The following additional sampling, analyses, and water level measurements are requested for the Industrial Landfill Area (Section 7.1):

- a. Well IR01MW1-6: Please analyze samples from this well for VOCs so that the extent of VOCs in the vicinity of the landfill can be better defined.**

Response: VOCs have been added to the analytical suite for well IR01MWI-6 in the final SAP (Table 7I).

- b. Well IR12MW11A: Please explain why no analyses are proposed for this well. The nearby wells are over 500 feet apart. Adding this well will reduce the amount of space between the wells.**

Well IR12MW11A was sampled once in 2001 and twice in 2002. Based on sample results (Table G-1 of the Phase III GDGI report for Parcel E [Tetra Tech 2003e]), the well does not meet BGMP selection criteria for additional monitoring. The Navy does not believe there is a need to continue monitoring at this well. The well was incorrectly indicated as selected for monitoring on Figure 11 and included in Table 7I. IR12MW11A has been moved from Table 7I to Table H-8, and the symbol on Figure 11 has been changed to indicate that it is not selected for monitoring.

- c. IR12MW19A: VOCs were detected at low concentrations in this well in 2002. In addition, there is no well monitoring this portion of the plume. This well should be added to the monitoring program for VOC analysis.**

IR12MW19A was incorrectly identified in Table H-8 as a redundant landfill monitoring well. Table H-8 has been modified in the final report to indicate that IR12MW19A may be sampled in the future.

- d. IR12MW14A: PCE and 1,4-DCB were detected in this well in June 2002 and was not confirmed in September 2002. This well should be monitored for VOCs for at least one year to determine whether VOCs are present at this location. In addition, the source should and extent should be determined.**

Based on EPA's comment, the Navy has reconsidered well IR12MW14A and has added it to the sampling program. (In the final SAP, IR12MW14A has been indicated as selected for sampling on Figure 14, has been added to Table 7L, and has been removed from Table H-11.) VOCs in groundwater in the vicinity of this well will be monitored in nearby upgradient and cross-gradient wells IR01MW42A, and IR01MW366A and in downgradient well IR12MW21A. Monitoring well IR04MW13A may be sampled in the future.

- e. IF01MWI-5: These A-aquifer wells are located within the landfill in the same general vicinity as B aquifer wells IR-1MW26B and IR01MW17B, respectively. At a minimum, water levels should be measured in these wells to determine the vertical groundwater flow direction in this area. Water level measurements in these wells will also be useful in determining the level of leachate within the landfill. As there is only one additional A-aquifer well within the landfill (IR01MW38A), it is recommended that water levels be measured in that well also.**

Water levels will be measured in wells IR01MWI-5, IR01MW17B, IR01MW26B, and IR01MW38A, as shown in Table G-1.

8. **Comment:** The following additional sampling, analyses, and water level measurements are requested for the Northwest Bay Fill Area (Section 7.2):

- a. **IR02MW101A2:** Elevated concentrations of barium were detected in the vicinity of this well. As there is a submerged storm drain line in the area that may be a conduit for groundwater flow, Board staff recommends determining the extent of barium along this submerged storm drain line.

Response: Please refer to the Navy's response to EPA, Parcel E, Northwest Bay Fill Area comment 2 for a discussion on metals, including barium, along the shoreline. In Table H-9, the Navy has identified inland wells that may be sampled in the future for metals.

- b. **IR02MW373A:** This well has exhibited high concentrations of copper, nickel, lead, and zinc in the past yet is not included in the monitoring program. This well should be monitored on a regular basis, and the source and extent of these contaminants should be defined.

Well IR02MW126A is downgradient from IR02MW373A and will provide warning if metals from IR02MW373A migrate downgradient toward the Bay. As shown on Figure 12 and noted in Table 7J, well IR02MW126A will be monitored for metals, including copper, nickel, lead, and zinc. Please see the Navy's response to EPA comment 2 on the Northwest Bay Fill Area in Parcel E for a discussion on metals along the shoreline.

9. **Comment:** The following additional sampling, analyses, and water level measurements are requested for the Oil Reclamation Ponds Area (Section 7.3):

- a. **IR03MW226A:** Zinc was detected at an elevated concentration in two of the last three samples collected from this well. Therefore, this well should be sampled at a minimum for zinc.

Response: Well IR03MW226A contains LNAPL; therefore, groundwater samples will not be collected. In addition, only two of the three most recent results for this well exceed the HGAL for zinc. The most recent zinc result for this well (32.9 µg/L) does not exceed the HGAL.

- b. **IR03MW371A:** Vanadium was detected above the HGAL in this well in the last three sampling rounds. Therefore, vanadium should be added to the list of analytes, and in addition, the extent of vanadium should be determined.

Total metals have been added to the list of analytes for well IR03MW371A (Table 7K of the final SAP).

- c. **IR03MW342A:** This well has exhibited elevated concentrations of barium and copper. Therefore, a downgradient well such as IR03MW224A should be sampled for metals. IR03MW224A is also downgradient of IR03MWO-1 and should be analyzed for TPH and PCBs.

IR03MW224A has been sampled several times for metals; the last time was in 2002. Barium has not been detected above HGAL in the last three sampling rounds, and copper has not been detected during the last three sampling rounds. The Navy does not believe that this well warrants additional sampling for metals at this time. IR03MW224A will be sampled for PCBs during the BGMP (Table 7K). TPH is addressed under a separate program at HPS unless it is commingled with a CERCLA contaminant. Well IR03MW224A will not be sampled for TPH since it is outside the boundary of the VOC plume (note "d" of Table 7K for explanation).

- d. **IR03MW218A1:** PCBs have been detected in this well; therefore, this well should be added to the monitoring plan for PCB analysis.

Aroclor-1260 was detected at a concentration of 32 µg/L in well IR03MW218A1 in July 1992. PCBs were not previously been detected in this well, and the well has not been sampled for PCBs since 1992. IR03MW218A2, located adjacent to IR03MW218A1 and screened in the same aquifer zone, will be sampled for PCBs as well as several other analytes of concern in the immediately vicinity of these two wells (Table 7K). The Navy considers that sampling well IR03MW218A2 for PCBs will sufficiently characterize existing PCB contamination in the immediate vicinity of IR03MW218A1.

- e. **IR02MWB-5:** The extent of PCBs, TPH, VOCs, and SVOCs should be determined since PCBs were detected in this well at 0.8 ppb when this well was last sampled in 1992.

PCBs have been added to the analytical suite for well IR02MWB-5 in the final SAP (Table 7M). Because no SVOCs, TPH, or VOCs have been detected in this well historically, however, the Navy does not plan to add SVOCs, TPH, or VOCs.

- f. **Additional wells should be proposed and installed downgradient of the Sheet Pile Wall to determine the concentration of contaminants discharging into the Bay.** While Board staff realizes that the Navy hopes to conduct a special project in the vicinity of the Oil Reclamation Ponds area, if this special project does not start in the near future, it is recommended that work on this area proceed due to the risk to the environment.

Please see response to EPA specific comment 1 on the Parcel E Former Oil Reclamation Ponds Area.

10. **Comment:** The following additional sampling, analyses, and water level measurements are requested for the Other Areas Northwest Area (Section 7.4):

a. **Additional wells should be identified or installed to determine and monitor the extent of mercury in well IR05MW85A.**

Response: Figure 14 and Table 7L both indicate that well IR05MW85A is proposed for groundwater sampling, and Table 7L lists mercury as an analyte for which this well will be sampled. Mercury concentrations at IR05MW85A have not consistently exceeded the HGAL. Four results from 1992 were above the HGAL, and four results from 1995, 1996, and 2001 were below the HGAL. The most recent mercury concentration, from 2002, from this well does exceed the HGAL. If future sampling results indicate an increase in mercury concentrations in well IR05MW85A, the need for additional monitoring around this well will be reevaluated.

b. **Additional wells should be identified or installed to determine and monitor the extent of pesticides in well IR36MW17A.**

Figure 14 and Table 7L indicate well IR36MW17A is proposed for groundwater sampling, and Table 7L indicates that IR36MW17A should be sampled for pesticides. IR36MW01A, which is located northwest of IR36MW17A, will also be sampled for pesticides.

11. **Comment:** The following additional sampling, analyses, and water level measurements are requested for the Other Areas Southeast Area (Section 7.5):

a. **The Tidal Influence Zone apparently has a significant impact on groundwater conditions in this area. This zone should be shown on Figure 15 and should be referenced in the text of the document.**

Response: The TIZ, as it was defined on Figure 3-5 of the Phase III, Parcel E groundwater summary report (Tetra Tech 2003e), has been added to Figure 15, and the text has been revised to reference this aspect of the figure. The TIZ was interpreted in the GDGI as extending approximately 100 to 200 feet inland along the Parcel E shoreline. The tidal influence on groundwater elevations in this zone are greater than 0.1 foot.

b. **Barium has been detected above the HGAL in wells IR14MW13A and IR39MW33A. These wells should be monitored and other wells in these areas should be monitored to determine the extent of barium.**

Please see the Navy's response to EPA, Parcel E, Other Areas Southeast specific comment 1 for a discussion on metals along the shoreline. The Navy will sample IR39MW33A for barium as recommended in the comment. Figure 15 and Tables 7M and H-12 have been revised accordingly.

- c. The extent of metals in the "metal reef" area should be determined and additional wells should be installed to better monitor this area as it is within the Tidal Influence Zone and groundwater is in direct connection with the Bay.

Please refer to the Navy's response to RWQCB's Parcel E Groundwater Sampling Design specific comment 11b regarding metals along the shoreline at the Other Areas Southeast.

Parcel B

General Comments

1. **Comment:** **RAMP vs. BGMP at Parcel B.** It is not appropriate to "incorporate" Parcel B Remedial Action Monitoring Plan (RAMP) requirements into the BGMP. All RAMP modifications and RAMP monitoring should be addressed inside the RAMP regulatory framework as per the Federal Facility Agreement (FFA). The RAMP reporting requirements must also be complied with (e.g., quarterly reports and annual reports as described in the RAMP). Removing RAMP wells, replacing RAMP sentinel wells and RAMP point-of-compliance (POC) wells, changing the total number of RAMP wells, changing RAMP well locations, and changing analytical program or trigger levels--all require revisions of the RAMP (a primary document). Proposing such changes inside this draft BGMP (a secondary document) is not acceptable regulatory process. Such proposals should be removed from the BGMP and submitted as a separate proposed RAMP revision. Of course, it is appropriate to propose additional non-RAMP work on Parcel B within the BGMP.

Response: The Navy has not attempted to use the BGMP to modify requirements of the RAMP. The Navy intends to fulfill all requirements of the RAMP, including the monitoring well network to be sampled, the analyte list for each monitoring well, analytical techniques, and sampling and reporting frequencies. The Navy has offered the regulatory agencies two reporting options: (1) provide one report documenting results of the quarterly monitoring and RAMP results, presented in a section separate from the summaries of results from other parts of the site, or (2) separate reports will be prepared and submitted for Parcel B, and for Parcels C, D and E. Since the RAMP was finalized in 1999, several monitoring wells have been removed as a part of remedial actions to address contaminated soils. These monitoring wells will be replaced, as discussed during a February 25, 2004, meeting between the regulatory agencies and the Navy, and will be monitored in Year 5, as originally specified in the RAMP (Tetra Tech 1999). A limited number of "supplemental characterization" monitoring wells have been added to the RAMP wells;

these wells are identified on Figure 4. Any further modifications to the RAMP will be discussed with the BCT as part of the 5-year evaluation dictated by the October 9, 1997, Parcel B ROD (Navy 1997).

2. Comment: BGMP and ROD Requirements at Parcel B.

a) In the BGMP, IRO6 is shown as located in Parcel C. However, IRO6 is within the boundaries of Parcel 8 in the Parcel B ROD. Similarly, in the BGMP, the Parcel B boundary adjacent to IR25 has been shifted about 50 feet to the west and about 25 feet to the south into Parcel C, which is not consistent with the ROD. Please revise the BGMP to be consistent with the ROD: delineation of new parcel boundaries should be addressed in a ROD amendment.

Response: The Parcel boundaries in this area have been revised so that IR-06 is situated in Parcel C instead of Parcel B. For this reason, the IR-06 plume is shown on Parcel C RU-C5 Figure 8A. This change in parcel boundaries is documented in a February 1, 2002, memorandum from Richard Mach, Navy Base Realignment and Closure Environmental Coordinator, to the HPS administrative record file (Navy 2002).

b) The Navy assumes (e.g., RAMP revision 3) that since soil sources have been removed, groundwater monitoring is not required: this has not been substantiated. Moreover, continued monitoring is explicitly required by the ROD. The ROD says: "groundwater will be closely monitored while source removal is implemented."

Parcel B groundwater has been and will continue to be monitored on a quarterly basis, in accordance with the RAMP (Tetra Tech 1999). No changes to the RAMP monitoring plan will be incurred during the Year 5 monitoring.

c) But, because Parcel B wells have been removed: data has not been collected, potential threats to the bay have not been monitored, impacts on groundwater of remedial actions along the shoreline have not been monitored, and IR10 VOC plumes have not been monitored as required by the ROD. These instances of non-compliance have been previously noted by agencies in comments on quarterly and annual reports. Removed wells include: all six "post-remedial action (PRA)" wells (Figure 4: IR07MW20A1, 21A1, 21A2, 24A, 25A, IR07MWS3), two point-of-compliance (POC) wells (Figures G-1 and 4: IR07MWS-4 and IR26MW45A), two on/off site migration wells (Figure G-1: IR18MW21A and IR07MW28A), and one volatile organic compound (VOC) monitoring well (Figure G-1: IR10MW33A.

The Navy removed contaminated soils in a number of areas. Because monitoring wells were situated in several of the soil excavation areas,

monitoring wells were removed as part of the excavation process. When the soil remedial action was completed, the Navy installed replacement monitoring wells. It was not possible to monitor groundwater in these areas during the period between removal of original wells and installation of replacement wells. The Navy has installed five replacement wells at IR-07 and they will be sampled. Well IR10MW33A has not been removed and will be sampled.

- d) "Potential" nickel and TCE plumes are designated on figures in the BGMP. The word "potential" should be deleted: these plumes were identified in the ROD and are not considered "potential."**

The Navy does not agree that a nickel plume is present at IR-07. Since the ROD was prepared, the nickel plume at the IR-07 area has been tentatively attributed to groundwater conditions associated with former stainless steel monitoring wells and high sediment concentrations in grab groundwater samples rather than a plume of contamination. Additionally, nickel has never been a chemical of potential concern (COPC) for any remedial action excavation in Parcel B and is a common constituent of serpentinite bedrock, which underlies the area. Accordingly, groundwater contamination by nickel in this area is identified on Figure 4 as a potential plume to indicate that nickel detected in this area may be an artifact of the monitoring well construction or natural background concentrations.

The IR-10/Building 123 area where groundwater has been impacted with TCE contamination has been relabeled on Figure 4 as the "approximate area of TCE contamination."

- e) Criteria for total petroleum hydrocarbons (TPH) are incorporated into the ROD by reference to the Corrective Action Plan (CAP: January 10, 2001), under oversight of the Regional Water Quality Control Board (RWQCB): please include (TPH) criteria.**

TPH criteria for groundwater depend on the distance from the shoreline. For locations near the shoreline, the criterion is 1,400 µg/L. For locations 250 feet or greater from the shoreline, the criterion is 20,000 µg/L (Tetra Tech 2001a).

3. Comment: BGMP vs. Parcel B RAMP

- a) In the BGMP, the Navy has not provided sufficient rationale for RAMP replacement wells (Table F-2). For example, the Navy should explain why one well (IR07MW29A) will suffice to replace three removed RAMP wells (i.e., wells IR07MW21A1, 24A and 25A). Also, no replacement well is proposed in the vicinity of IR07MW20A1 or for point-of-compliance (POC) well IR26MW45A.**

Response: The Navy recently installed five replacement monitoring wells in Parcel B at the locations of the following decommissioned monitoring wells: IR07MW21A1, IR07MW24A, IR07MW25A, IR07MW26A, and IR07MWS-4. These replacement monitoring wells are shown on Figure 4, and their sampling and analyses plans are presented in Table 7A. Well IR07MW20A1 has not been decommissioned. Figure 4 has been revised to provide more clarity in regards to what wells have been decommissioned, but the nearby non-RAMP well IR07MW20A2 was decommissioned, not IR07MW20A1. The Navy will continue to monitor IR07MW20A1 as a post-remedial action monitoring well. Three wells were installed in the vicinity of the POC well IR26MW45A: IR26MW46A, IR26MW47A, and IR26MW48A. Groundwater analytical data from all three of these replacement wells are evaluated against POC criteria.

- b) Groundwater data has not been collected post-remedial action, as required by the ROD (since wells were removed). Also, all soil data has not been received and reviewed. So, proposed new well locations downgradient of IR07 and IR18 and other source areas cannot be fully evaluated with respect to current groundwater contamination. Purportedly, soil contamination in the IR07/18 area is widespread and concentrations are high. If so, then more wells (not fewer) might be needed in and downgradient of IR07 and IR18, to monitor potential threats to the San Francisco Bay.**

The Navy has replaced five of the decommissioned wells at IR-07 and the groundwater analytical data to be collected from these wells and existing wells will provide adequate coverage for the area.

- c) Similarly, with respect to the removed IR10 VOC well, all data (soil, groundwater and soil gas) has not been received (e.g., IR10 treatability study (TS) reports soil vapor extraction (SVE) and zero valent injection (ZVI)), so proposed new well locations cannot be fully evaluated. Purportedly, the VOC plume has expanded at IR10, so careful review of all new data is required prior to evaluating new well locations.**

Figure 4 illustrates the locations of five new monitoring wells installed in IR-07 by the Navy. None of these new wells is located in or near IR-10. Ten monitoring wells in the IR-10/Building 123 area are proposed VOC monitoring locations, in addition to two downgradient POC wells that will be sampled for VOCs. The need for additional characterization at IR-10 may be evaluated as part of the 5-year evaluation dictated by the RAMP (Tetra Tech 1999). The VOC plume has decreased in size as a result of the ZVI treatability study.

- d) At IR10, there is no aquitard separating the A- and B-aquifers, the B-aquifer has not been investigated, and dense non-aqueous phase**

liquids (DNAPLs) have not been ruled out (as noted in previous comments). Installation of wells into the B zone would be prudent, especially given the TSs (e.g., SVE and ZVI) performed at IR10.

The Navy does not propose to modify the monitoring program agreed to in the 1999 RAMP (Tetra Tech 1999) by installing and sampling monitoring wells in new locations. Figure 7-2 from Parcel C, Phase III GDGI, groundwater summary report (Tetra Tech 2003d) shows no B-aquifer at the eastern edge of the IR-10 site. Upper and lower A-aquifer zones are in direct hydraulic communication with one another in this area.

Dissolved VOC concentrations have not been detected at concentrations above 1 percent of the pure-phase aqueous solubility for respective compounds, the level at which EPA suggests potential for DNAPL exists (EPA 1992). Based on EPA guidance and the lack of other indications of DNAPL in the extensive soil and groundwater data from the area, the Navy does not intend to install additional wells to test for DNAPL.

- e) The proposed location for IRO7MW30A is not adequate as a replacement well for POC well IRO7MWS-4 since 30A is not located at the "high-tide line of the Parcel B tidally influenced zone (TIZ), which is the point of compliance (POC)", as required.**

Please see the Navy's response to DTSC Parcel B general comment 3a. Figure 4 and Table 7A have been revised to propose replacing five decommissioned monitoring wells at IR-07.

- f) Well designations in the BGMP do not agree with RAMP well designations (RAMP revision 1: May 19, 1999). For example, the RAMP identifies 4 "VOC monitoring wells" (Section 2.2.1.4): IR10MW33A, IR10MW28A (which is also a sentinel well) and IR50MWO1A and IR10MW31A (which are also POC wells). The BGMP identifies IR10MW33A as a VOC monitoring well (in agreement with the RAMP) but does not cite the other three RAMP VOC monitoring wells. The BGMP designates 5 other wells as VOC monitoring wells. These are IR10MW59A, IR10MW13A, IR10MW14A, IR25MW17A and IR10MW12A (which is also a hexavalent chromium monitoring well). Although it is appropriate to have additional monitoring wells for VOCs at IR10 (and elsewhere on Parcel B), discrepancies in well designation are confusing. Please maintain RAMP designations for wells: if these have been formally changed (in primary documents), please cite documentation in support of changes, with agency approvals.**

Well designations used in the revised BGMP will use the same designations used in the RAMP. Figure 4 and Table 7A have been revised to show all RAMP wells with their original RAMP designation and all

non-RAMP wells as "supplemental characterization wells." The RAMP did not identify IR10MW12A as a RAMP monitoring well, although it has been sampled throughout the past 2 years of the RAMP as the only dual-purpose hexavalent chromium and VOC well. IR10MW12A will retain its designation as a dual-purpose well.

- g) All wells which are non-RAMP wells in Parcel B for either ground water level monitoring or sampling should be called by the same designation: "supplemental monitoring wells" would suffice. Further re-designation could be proposed in a future RAMP revision or ROD amendment.**

Figure 4 and Table 7A have been revised to show all RAMP wells with their original RAMP designation and all non-RAMP wells as "supplemental characterization wells."

- h) Regarding the analytical program, the RAMP says (Section 2.2.3): "Groundwater samples will be analyzed for the detected organic or inorganic constituents previously detected in the associated plume, at a minimum." TPH sampling is also required. Note that the RAMP does not say that only analytes above trigger levels need to be included in the analytical program. (Trigger levels are action levels, not screening levels for inclusion in the analytical program.) Please confirm that the proposed analytical program for RAMP wells fully satisfies the RAMP minimum requirements and that all compounds detected in the vicinity of each well have been maintained in the analytical program.**

Please see the Navy's response to DTSC Parcel B general comment 1. Section 2.2.3 has been modified to state that the Navy will analyze the wells for the analytes identified in the 1999 RAMP (Tetra Tech 1999).

- i) All method analytes should be analyzed for. A subset of method analytes is not acceptable. RAMP tables indicate methods for analysis--not subsets of method analytes (e.g., Table 2). Change in sampling frequency is discussed in the RAMP but change in analytes is not discussed except as part of the 5 year review process. For example subsets of metals, subsets of semi-volatile organic compounds (SVOCs), or a single polychlorinated biphenyl (PCB: e.g., Aroclor 1260) are not acceptable. Please revise BGMP Table 7A accordingly.**

BMGP, Section 8.5 Analytical Methods says: "Appendix C presents the *individual target analytes* for this investigation and there associated PRLs..." (Emphasis added). Use of the term "individual target analytes" is not recommended. This has been discussed at length in comments on the Parcel B soil sampling plans and in DGIs. Please clarify whether analysis for a subset of method analytes is implied by this term: if so, please delete.

Please see the Navy's response to DTSC Parcel B general comment 1.

- j) **VOC plumes should be defined to new lower human-health criteria for inhalation risks (e.g., the Navy's estimate was 5 ug/l for TCE at IR10). And, in scoping meetings for the BGMP, it was agreed that all organic plumes (including VOCs) would be defined to non-detect ("ND") levels. Please confirm that all wells needed for ND-level of plume definition for VOCs have been included in the BGMP (at IR10, IR06 and IR25 where the plume underlies Parcel B).**

Similarly, please include wells for defining the polynuclear aromatic hydrocarbon (PAH) plume near utility well IR06MW42A. At IR06MW42A, trigger levels are defined with respect to sanitary system discharge requirements which are greater than human-health criteria. PAHs are below these trigger levels. But, the extent of PAHs has not been defined with respect to human-health risks (e.g., the PRG for benzo(a)pyrene is 10 ug/L). Since SVOCs may be elevated in the IR06 tank farm area, analysis for SVOCs is recommended in the IR06 area.

Please see the Navy's response to DTSC Parcel B general comment 1. The need for additional monitoring to characterize VOC and PAH plumes will be addressed as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997).

- k) **DTSC had previously requested (e.g., letter: October 17, 2002) that IR10MW13A2 be included as a monitoring well at IR10 since it is screened in a deeper zone than 13A1: please include on Table 7 A.**

Please see the Navy's response to DTSC Parcel B general comment 1. The Navy may consider the need for additional monitoring in this area as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997).

- l) **Organotin should be added to all wells in areas where sandblast grit was used (sub-base and painting areas), stored (e.g., IR06), or disposed (e.g., IR07 disposal pits), as previously requested.**

Please see the Navy's response to DTSC general comment 1. The Navy may consider monitoring for additional analytes as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997).

- m) **Please clarify that manganese is included in USEPA's Contract Laboratory Program (CLP) for metals: if not, please add.**

Manganese is included in the EPA's CLP for metals.

- n) **Similarly, confirm whether mercury (Hg) is a CLP metal: if not, it should be added as an analyte, especially for wells in the vicinity of IR25 (TM Figure 4-15) and IR20 where aquatic exceedences are not uncommon.**

Mercury is included in the EPA's CLP for metals.

- o) Hexavalent chromium (CrVI) should be included for IR10 wells since the plume overlaps the VOC plume and extends over a large area, especially if human-health criteria are considered (Technical Memorandum Parcel B Groundwater Evaluation (TM Figure 4-12). DTSC has previously requested (e.g., letter October 17, 2002) that the following wells be analyzed for CrVI: IR10MW33A and 59A. Please include CrVI as an analyte for these wells on Table 7A. CrVI should also be included as an analyte for IR25 wells with previous hits (TM, Figure 4-12), and for nearby wells.**

Please see the Navy's response to DTSC Parcel B general comment 1. The Navy may consider monitoring for additional analytes as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997). In addition to sampling IR10MW12A for hexavalent chromium, the Navy proposes sampling downgradient POC well IR10MW31A1 and the cross-gradient sentinel well IR10MW28A both for hexavalent chromium. In the IR-25/Building 134 area, two IR-06 and one IR-25 monitoring wells are proposed for hexavalent chromium. Sampling of groundwater for hexavalent chromium at Parcel B is supplemental to the RAMP.

- p) More wells should be analyzed for 1,4-dioxane in VOC plume areas, including IR10, IR25 and IR06, and in areas where painting and stripping operations occurred. Again, the Navy should request all method analytes (not just 1,4- dioxane).**

Please see the Navy's response to DTSC Parcel B general comment 1. The Navy may consider monitoring for additional analytes as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997).

- q) With respect to manganese (Mn), large areas of Parcel B have high concentrations-up to 18,200 ug/L (TM Figure 4-14), greatly exceeding human-health criteria (e.g., IRIS drinking water level of 300 ug/L). No aquatic criteria are presented for Mn: DTSC defers to this RWQCB with respect to ecological criteria for Mn.**

The A-aquifer is not considered a potential source of drinking water by the RWQCB. Comments regarding ecological criteria for manganese have not been received from the RWQCB.

- r) The RAMP Section 2.2.2 says: "The depth of new monitoring wells will typically be from 15 to 20 feet below ground surface. The bottom of each well will be a minimum of 5 feet below the A-aquifer lowest groundwater table. Monitoring wells installed in areas of soil excavations (for example, in remediation area 7-1) or in areas of limited drilling access may be installed in an open excavated hole and backfilled with clean sand materials." Specific well installation, construction, surveying and development instructions and requirements are stipulated in Section 2.2.2.1.**

Specific sampling requirements (e.g., "low-flow (minimal drawdown)" sampling, filtering, and stabilization criteria) are stipulated in Section 2.2.2.3 et seq. Confirm that all wells, including supplemental monitoring wells, meet these requirements. For wells installed in excavations, please provide chemical analytical reports showing that excavations were backfilled with clean sand, as required.

All supplemental characterization monitoring wells meet the requirements for well installation detailed in Section 2.2.2.1 of the RAMP (Tetra Tech 1999). No monitoring well was installed in open-hole excavations. If it was deemed necessary to remove or decommission a monitoring well during the remedial action excavation process, then the well was decommissioned appropriately, and the replacement wells were or will be installed according to the details outlined in Section 2.2.2.1 of the RAMP (Tetra Tech 1999). For information on excavation backfill material, please see the draft Parcel B construction summary report (Tetra Tech 2002).

- s) **The proposed groundwater level monitoring program for Parcel B is acceptable for the A-aquifer (except as noted below). However, the program is not adequate in that horizontal gradients and flow directions will not be determined for deeper zones and vertical gradients will not be determined. Additional comments on groundwater level monitoring are provided in Additional non-RAMP work comments and in Appendix G comments, below.**

Groundwater elevations will be measured at the two B-aquifer wells at Parcel B and several bedrock water-bearing zone wells near Parcel B, in the IR-06/IR-25 area, as shown on Figure G-2. The groundwater level monitoring component of the RAMP, as discussed in the RAMP's Section 2.1 (Tetra Tech 1999), did not include the B-aquifer or the bedrock WBZ.

- t) **Please include all RAMP wells, all supplemental monitoring wells (including ZVI wells), all bedrock wells and all deeper wells in the groundwater level monitoring program.**

All RAMP monitoring wells, the IR-26 supplemental characterization wells, both B-aquifer wells at Parcel B, and several bedrock water-bearing zone wells near Parcel B in the IR-06/IR-25 area are included in the groundwater level monitoring program. The groundwater level monitoring network proposed by the Navy in Appendix G of the draft SAP is adequate for continued characterization of groundwater flow.

- u) **Please explain why only 3 Parcel B wells (IR26MW46A, 47A and 48A) are inspected quarterly (Table F-1), and these three wells are non-RAMP wells which have been recently installed. Why are RAMP wells not inspected quarterly prior to sampling? Clarify whether the source of "roots" noted on sampling forms for**

IR10MW12A has been identified: has this well been compromised?

All wells sampled quarterly during the RAMP program are inspected for integrity before sampling. Table F-1 has been revised to suggest that only IR26MW46A, IR26MW47A, and IR26MW48A are not the only wells inspected quarterly. All wells that are part of the BGMP will be inspected on a quarterly basis and maintenance will be conducted as necessary based on the well inspections.

v) Error (Table F-2). Total depths of IRO7MW29A and 30A are not correct.

Table F-2 has been revised to accurately document the well construction details for the five recently installed replacement wells at IR-07 in Parcel B. Please refer to the Navy's previous response to DTSC Parcel B general comment 3a regarding the well locations.

4. Comment: Additional non-RAMP work on Parcel B

a) As noted above, IR06 is in Parcel B (not C). The IR06 plume should not be shown as part of RU-C5 groundwater plume (e.g., Figure 8A), since it is located in Parcel B.

Response: As stated in the Navy's response to DTSC Parcel B general comment 2a, the parcel boundaries have been revised, and IR-06 is situated in Parcel C instead of Parcel B. For this reason, the IR-06 plume is shown on the Parcel C RU-C5 Figure 8A. The revision of the parcel boundaries is documented in a February 1, 2002, memorandum from Richard Mach, Navy BRAC Environmental Coordinator, to the HPS administrative record file (Navy 2002).

b) The extent of the VOC plumes for IR25 and IR-06 and all recent groundwater monitoring data for IR06 and IR25 should be shown on Parcel B figures, so that potential impacts to Parcel B and locations for new wells can be evaluated.

Please see the Navy's response to DTSC Parcel B general comment 4a. The IR-06 and IR-25 plumes are shown on Parcel C RU-C5 Figures 8A and 8B. In addition, all analytical data for IR-06 and IR-25 are provided in Appendix I of the Parcel C groundwater summary report for Phase III GDGI (Tetra Tech 2003d).

c) Vinyl chloride (VC) up to 1000 ug/L has been measured in IR06 (at post-RI well IR06MW59A1: TM Figure 4-30. Much higher concentrations of VC have been measured in adjacent IR25 (which is on Parcel C). PCE, TCE, and DCE have also been measured at elevated concentrations at IRO6MW59A1 along with benzene. No VC values are provided at IR06MW59A1 for RAMP fourth quarter sampling (TM Figure 4-39). No monitoring wells exist west and north of IR06MW59A1. Additional investigation would

be prudent to west and north of 59A1 to ensure that VOCs have not migrated. This is especially critical, given: the very high concentrations measured, the toxicities of some VOCs, and the unrestricted residential reuse of the ROD.

Monitoring wells IR06MW35A and IR06MW52F, situated to the west of IR06MW59A1, were selected for VOC monitoring in the BGMP (Figure 8A and Table 7E). Monitoring wells IR06MW40A and IR06MW47F, located north-northeast of IR06MW59A1, also were selected for VOC monitoring (Figures 8A and 8B and Table 7E). Since groundwater in the vicinity of IR06MW59A1 flows toward the east, the Navy believes that continued VOC monitoring of these four wells is adequate for monitoring the potential migration of VOCs from IR06MW59A1 toward Parcel B.

- d) Since IR06 is a potential DNAPL site, wells should be located on the upper surface of the shallow bedrock layer to determine if DNAPL is migrating along topological gradients. The bedrock gradient is toward the north and west of IR06MW59A1 (RI Figure 3.7-5); more wells are needed in this area.**

IR-06 wells IR06MW35A, IR06MW40A, IR06MW47A, IR06MW52F, IR06MW59A1, and IR06MW59A2 were selected for additional VOC monitoring as part of the BGMP. These wells plus well IR06MW46A will also be included in the groundwater level measurement effort. All wells included as part of the BGMP will be screened for nonaqueous-phase liquids. If DNAPL is found at IR-06, additional investigation of DNAPL will be conducted.

Dissolved VOC concentrations have not been detected at concentrations above 1 percent of the pure-phase aqueous solubility, the level at which EPA suggests potential for DNAPL exists (EPA 1992). Based on EPA guidance and the lack of other indications of DNAPL in the extensive soil and groundwater data from the area, the Navy does not intend to install additional wells to test for DNAPL at IR-06.

- e) In the IR06 area, groundwater flow directions on Figures 4 and 8A do not agree with those on Figures 3 and G-1 in IR06 area. Figures 4 and 8A show strong direction to the east southeast onto Parcel C (contrary to site subsurface topography), but Figures 3 and G-1 show significant flow to the north into Parcel B. The latter interpretation is more consistent with RI figures. More data points are needed to clarify groundwater flow directions. Additional wells are needed for water level measurements to the north of IR06MW59A1 (where additional information is also needed on plume extent).**

The Navy does not agree that the groundwater flow directions on Figures 4 and 8A and on Figures 3 and G-1 are inconsistent, but they do present groundwater flow data at different scales. The predominant groundwater flow direction at IR-06 is toward the east southeast because

of an east-southeast trending groundwater trough between IR-06 and IR-25. The Navy believes that the 13 wells selected for water level measurements in and around the trough will adequately define groundwater flow in this area.

- f) The trough along Lockwood Street (near utility well IR06MW42A) is a dominant flow feature between IR06 (on Parcel B) and IR25 (on Parcel C). This trough is likely controlled by pumping of the sanitary system: when the pumping regime is changed during site development, flow directions will likewise change. Please clarify whether changes to the pumping regime are expected during the field work for the BGMP: if so, additional wells may need to be included in the groundwater level measurement program.**

The Navy believes that the 13 wells selected for water level measurements in and around the trough will adequately define groundwater flow in this area, regardless of modifications to the pumping regime of the sanitary sewer system.

- g) Please clarify how various wells are being interpreted with respect to aquifer zones. Some "F" (i.e., "bedrock") wells are assigned to the A aquifer on Figure 8A (e.g., IR06MW52F and 53F), but other "F" wells are not (e.g., IR06MW47F, 52F, 53F and new well IR25MW62F).**

As noted in Section 3.2.1 of the Parcel C groundwater summary report for the Phase III GDGI (Tetra Tech 2003d), during Phase III of the GDGI, "hydrostratigraphic interpretations were made based on parcelwide and RU-specific cross sections. The aquifer designations of some well names (assigned at the time of well installation) do not agree with the current hydrostratigraphic interpretation. The well names, therefore, should not be relied upon for accurate aquifer designation." Current aquifer designations for all HPS groundwater monitoring wells are shown in Table F-1 of the BGMP. Proposed monitoring well IR25MW62F will not be installed due to logistical problems at RU-C5.

- h) IR06MW50F and 56F should be added to the groundwater level measurement program, to include data points in the F (bedrock) zone surrounding IR06. Paired wells IR06P54FA and P54FB should also be included.**

IR06MW50F and IR06MW56F are included in the groundwater level measurement program (Table G-1, Parcel C bedrock WBZ wells). In addition, IR-06 bedrock WBZ wells IR06MW47F, IR06MW54F, IR06MW55F, IR06MW57F, and IR06MW58F are included in the groundwater level measurement program (Table G-1). The Navy believes that these seven bedrock WBZ wells provide sufficient coverage of the area bedrock WBZ in the IR-06 area.

- i) Many wells have been removed in the IRO6 area including several wells with high concentrations (e.g., IR06MW 22a, 30A, 32A). More wells may be needed within plume boundaries to replace removed wells. This is difficult to evaluate without updated figures showing historical concentrations.**

Please refer to the Parcel C groundwater summary report for the Phase III GDGI (Tetra Tech 2003d) for historical chemical concentrations for the IR-06 vicinity wells. Historical data are shown on chemical concentrations figures if evaluation criteria have been exceeded. In addition, all analytical data for all Parcel C wells (including those in IR-06) are provided in Appendix I of the draft SAP. Based on the Navy's review of the historical chemical concentration data for IR-06, the Navy believes that the wells selected in the draft SAP provide sufficient coverage in this area.

- j) At IR26 (i.e., 26-2), TCE at high concentrations (21 mg/kg) was measured in soil but TCE was mistakenly not identified as a compound of potential concern (COPC) for 26-2, as discussed in DTSC's comments on the Parcel B Construction Summary Report (CSR). It is not known whether VOCs have impacted groundwater or whether soil sources still exist at IR26: more investigation may be prudent at this time.**

All RAMP POC wells will be analyzed for VOCs as specified in the RAMP; including IR-26 well IR26MW41A (Tetra Tech 1999). Additional investigation for VOCs in IR-26 soil and groundwater will be evaluated during discussions with the BCT for the Parcel B TMSRA.

- k) At least one well west of IR26MW46A and 48A, is needed--to evaluate effects of the large subsurface drainage channel. The drainage channel should be added to figures. The drainage channel should be investigated.**

As noted in Navy's response to DTSC Parcel B general comment 1, the Navy does not propose to modify the monitoring program agreed to in the 1999 RAMP (Tetra Tech 1999) by installing and sampling monitoring wells in new locations. The need for additional characterization will be assessed as part of the 5-year review, as dictated by the ROD (Navy 1997). Investigation of the subsurface drainage tunnel at IR-26 will be evaluated during discussions with the BCT for the TMSRA to be submitted to the BCT in November 2004. Figure 4 has been modified to show the drainage tunnel.

- l) An industrial drain line (IDL) traverses the entire parcel. The IDL was described (email from Richard Mach, November 6, 2001) as follows: "Newly discovered construction drawings (circa 1956) indicate that a 10" glazed vitrified clay pipeline (VCP) may have been a gravity flow drain for some former industrial activities in Parcel B. This pipeline was overlooked in previous investigations,**

because more recent documents identify it as an abandoned portion of the sanitary sewer collection system. The pipeline appears to originate in IR10, between Buildings 123 and 134 (at about 2 feet bgs) flows approximately 1,200 feet to the northwest under Lockwood Street to a former discharge point, currently in IR-07 (at approximately 12 feet bgs)." In the Construction Summary Report (CSR) the IDL was identified as a site, but the IDL was not investigated. On BGMP figures, the IDL is not identified as a site, but is shown as a submerged sanitary line. Please revise BGMP figures to show the IDL as a site, and revise the legend accordingly. Effects of the IDL on groundwater have not been fully determined.

The Navy removed the industrial drain line (IDL), excavated surrounding soils in a 5-foot-wide trench surrounding the IDL, and conducted confirmation soil sampling. An addendum to the Parcel B construction summary report describing the removal and soil sampling results is being prepared for June 2004 delivery to the BCT. Groundwater data in the vicinity of the IDL will be evaluated during discussions with the BCT for the Parcel B TMSRA. Figure 4 has been modified to show the location of the former IDL.

m) An additional well downgradient of IR56 (in the direction of the bay) may be needed to monitor the zinc plume at IR56.

IR-56 is located in Parcel E, not in Parcel B. There is no known zinc plume in the groundwater at IR-56. One monitoring well at IR-56 (IR56MW39A) was selected for monitoring in the draft BGMP, for VOCs, SVOCs, and TPH; however, this well, as well as the other wells in the IR-56 area do not meet the selection criteria for metals sampling.

n) There are only 2 B-aquifer wells (IR18MW100B and 101B) on Parcel B, and both are located near the western property boundary. The nature and extent of contamination has not been determined in the B-aquifer. Gradients (both horizontal and vertical) and other aquifer properties have also not been determined,

As described on page 19 of the draft SAP, the B-aquifer is absent over most of Parcel B. Areas do exist where the A-aquifer directly overlies the B-aquifer, notably in the western portion of Parcel B in IR-18. The technical memorandum on the distribution of the Bay Mud Aquitard and characterization of the B-aquifer in Parcel B (Tetra Tech 2001b) states this; however, the Navy recommended no further action regarding the B-aquifer at Parcel B.

- o) It is noteworthy that there are no B-aquifer wells monitoring VOC contamination, at IR10, where there is no aquitard between A- and B-aquifers. The deeper aquifer should be investigated. At the minimum, deeper wells should be installed in VOC areas to check whether contamination (both dissolved phase and dense, non-aqueous phase liquid (DNAPL)) has migrated vertically. In the IRO6 area, where bedrock is shallow, density-driven DNAPL migration would follow bedrock contours. Has IR06 been investigated for DNAPL along topological gradients?**

Regarding IR-10, the Navy does not propose to modify the monitoring program agreed to in the 1999 RAMP (Tetra Tech 1999) by installing and sampling monitoring wells in new locations. The need for additional characterization will be assessed after 5 years of monitoring, as dictated by the ROD (Navy 1997). Additionally, while no B-aquifer wells currently exist in IR-10, two lower A-aquifer monitoring wells (IR10MW13A2 and IR10MW31A2) are located directly downgradient of the TCE plume area at IR10MW59A. Figure 4-36 (Tetra Tech 1999) shows the locations of these wells. The maximum concentration of TCE detected in well IR10MW13A2 was 0.6 µg/L; TCE was not detected in well IR10MW31A2.

Regarding the potential for the presence of DNAPL at IR-10, dissolved VOC concentrations do not indicate the presence of DNAPL.

- p) Proposals for additional non-RAMP work on Parcel B could not be fully evaluated because all groundwater, soil gas, and soil data (e.g., IR10 ZVI TS) have not been provided and because all areas have not been investigated (e.g., industrial drain line). With respect to such areas, review of proposals is postponed pending review of data.**

Comment noted.

- q) With respect to analytical program, non-RAMP wells (i.e., supplemental monitoring wells) should satisfy the minimum requirements for RAMP wells (discussed above).**

Supplemental characterization (non-RAMP) wells will be sampled in accordance with BGMP protocols, as they are not subject to RAMP requirements. Supplemental characterization wells (IR26MW46A, IR26MW47A, and IR26MW48A) are incorrectly referred to as RAMP wells in the rationale column of Table 7A of the draft SAP. These references have been deleted from Table 7A in the final SAP.

- r) For new wells, the full suite of analytes must be analyzed for, since the groundwater at new well locations has not been characterized. For example, IR26 wells should be analyzed for the full suite and B-aquifer wells should be analyzed for the full suite.**

No new wells are proposed for IR-26, nor are any new B-aquifer wells proposed for Parcel B. RAMP post remedial action wells IR07MW21A1, IR07MW24A, IR07MW25A, and IR07MW26A, and RAMP POC well IR07MWS-4 have been replaced, and the replacement wells will be sampled in Year 5 of the RAMP for the same list of analytes as in previous years; these analytes were identified as the chemicals of potential concern in this area. Any new wells installed in the future will be analyzed according to the DQO process.

- s) **New wells and all groundwater sampling in Parcel B should comply with detailed RAMP requirements for well installation, development, etc. discussed above.**

All new RAMP wells will be installed according to RAMP requirements.

- t) **Cyanide and ammonia were "surprise" contaminants on Parcel E with respect to potential impacts to the bay. Please confirm that cyanide and ammonia have been fully evaluated with respect to threats to the San Francisco Bay. In particular, all wells adjacent to the bay and all wells near plating operations should be assessed (e.g., IR10).**

Based on site history, ammonia is not expected to be a chemical of concern at Parcel B because it is associated mainly with decomposition of organic wastes in landfills. Soil, groundwater, and floor scrape samples from Parcel B have been analyzed for cyanide. Cyanide was not identified as a chemical of concern in the Parcel B remedial investigation (RI) and FS.

- u) **Evaluation of proposed non-RAMP work was hampered because contradictory information was presented regarding wells removed and wells remaining on site. For example, please clarify whether RAMP "volatile organic compound (VOC)" well IR10MW33A and RAMP on/off site monitoring wells IR07MW28A and IR18MW200A still exist. With respect to decommissioning, the following wells are portrayed differently on Figures 4 and G-1: IR18MW20A, IR07MW27A, IR07MW28A, IR10MW33A, IR23MW14A, IR60MWO4A, IR60MW10A, IR46MW42A, IR07MWS-3 and 26A (one unnamed well still shown on Figure G-1). Please include all decommissioned wells ("x'ed out) on all figures. And, resolve discrepancies between figures, tables and text.**

The following discrepancies have been corrected:

- IR10MW33A still exists. Figure G-1 and in Table F-1 have been corrected to show that this well has not been decommissioned.
- IR07MW28A still exists. The X, denoting a decommissioned well, has been removed from Figure G-1 and Table F-1 has been corrected.

- IR18MW200A still exists. Figure G-1 and in Table F-1 originally showed that this well had been decommissioned; they have been corrected.
- No well identified as IR18MW20A currently exists or existed at HPS. Well IR18MW21AD, with a similar identification, is decommissioned; the X, denoting a decommissioned well, has been shifted slightly on Figure 4 so that it is clearly referring to IR18MW21AD and not IR18MW21A. Well IR18MW21A, with a similar identification, exists.
- IR07MW27A exists. Figure G-1 and in Table F-1 have been corrected to show this well as not decommissioned.
- IR23MW14A is decommissioned, as shown on Figure 4 and in Table F-1. Figure G-1 and in Table G-1 have been modified to reflect this.
- IR60MW04A is decommissioned, as shown on Figure 4 and in Table F-1. Figure G-1 and in Table G-1 have been modified to reflect this.
- IR60MW10A is decommissioned, as shown on Figure 4 and in Table F-1. Figure G-1 has been modified to reflect this.
- IR46MW42A is decommissioned, as shown on Figure 4 and Table F-1. Figure G-1 and Table G-1 have been modified to reflect this.
- IR07MWS-3 is decommissioned, as shown on Figure 4 and Table F-1. Figure G-1 has been modified to reflect this.
- IR07MW26A is decommissioned, as shown on Figure 4 and Table F-1. Figure G-1 has been modified to reflect this.

5. **Comment:** **Parcel B groundwater and ROD amendments**

- a) A Parcel B Record of Decision (ROD) amendment has been under discussion for several years now. The ROD states (page 3): "The Navy recognizes that a change to the groundwater remedy may require a ROD amendment." However, no mention is made in the BGMP of the ROD amendment. Some changes seem likely—for example, new wells will be required for the expanded VOC plume at IR10. And, some ROD revisions are incorrectly assumed in the BGMP, as noted above (e.g., revised parcel boundaries at IRO6 and IR25). In a ROD amendment, a change in remedial actions (including perhaps institutional controls) may be proposed for all VOC plumes, including plumes at/from IR06 and IR25, due to lowered preliminary remedial goals (PRGs) for VOCs in indoor air.

Detailed discussions on Parcel B groundwater and the ROD amendment between agencies and the Navy would be prudent at this time, so that any additional data needed to support proposed changes may be identified and collected in a timely fashion. All data should be provided for review prior to developing the ROD amendment.

Response: The Navy looks forward to discussing proposals for a ROD amendment with the BCT and will prepare a TMSRA to document the evaluation process. The TMSRA will include discussion of any proposed changes to the RAMP, including defining VOC plumes to the updated human health goals and providing a buffer zone. The BGMP will be revised annually to account for any new information or concerns.

b) Monitoring of VOC contamination at IR10 is required by the Parcel B Record of Decision (ROD). Two new IR25 (Parcel C;) VOC plume wells (IR25MW61A and 61A2) are proposed for installation inside Parcel B. In the ROD amendment, these wells should be identified as "Parcel B VOC monitoring wells" since these wells will monitor the IR25 plume as it passes under Parcel B. Such VOC wells should be identified as Parcel B wells because inhalation risks to Parcel B residents and workers are the critical concerns. Remedies, including engineering controls and institutional controls, will need to be considered in the Parcel B ROD amendment for all VOC plumes under Parcel B.

Please see the Navy's response to DTSC Parcel B general comment 1. The Navy may consider the need for monitoring additional wells after 5 years of monitoring has been completed (December 2004). The inclusion of monitoring wells IR25MW61A and IR25MW61A2 in the RAMP will be considered in the TMSRA.

c) With respect to contaminants of potential concern (COPCs), the ROD focused on ecological threats to the San Francisco Bay and on inhalation risks at IR10. Inhalation risks at other sites and drinking water risks were not considered. All contaminants which might pose a risk to human health were not identified as COPCs, and plumes were not defined with respect to human health risks (except for VOCs at IR10). Therefore, the extent of contamination with respect to human health risks has not been fully defined. Some examples: PAHs at IRO6MW42A and arsenic in IR18.

In preparation for the ROD amendment, all existing data should be screened against updated risk-based criteria (human-health and ecological) and tables and figures provided which illustrate all exceedences of risk-based criteria.

The TMSRA will screen Parcel B data against viable exposure pathways and updated human health and ecological risk-based goals where appropriate.

6. **Comment:** Parcel B Trigger Levels

- a) Parcel B trigger levels given on Table G-1 do not agree with Parcel B ROD trigger levels (Table 10). Please provide all trigger levels given in the ROD. For completeness of the record, if trigger levels were formally changed post-ROD, provide both ROD levels and revised trigger levels and cite the appropriate primary documents which formalized the revisions.

For example, trigger levels are provided in the ROD but not in the BGMP for semi-volatile organic compounds (SVOC): hexachloroethane, naphthalene, pentachlorophenol, phenanthrene), benzene, chloroform, 2,6-dinitrotoluene, heptachlor epoxide, and total petroleum hydrocarbons quantified as gasoline and diesel (TPH-g and TPH-d). 2,6-dinitrotoluene is not included on BGMP Table C- 1. No trigger level is provided for hexavalent chromium: for other metals, trigger levels in the BGMP do not agree with ROD trigger levels. All volatile organic compounds (VOCs) are not included: please include ROD trigger levels for all VOCs.

Trigger levels based on human health are provided in the ROD (Table 10) for 7 VOCs: these are cis- and trans-dichloroethene (DCE), TCE, tetrachloroethene (PCE), 1,1 ,2,2-tetrachloroethane (TCA), 1,1,1-TCA and vinyl chloride (VC).

Response: The intent of Table C-1 is not to list all trigger levels presented in the ROD; rather, Table C-1 is designed to verify that the analytical methods used by the Navy have sufficient resolution for comparison with applicable screening levels from the RAMP (Tetra Tech 1999). The trigger levels presented in Table C-1 are those that were listed in the RAMP. TPH results are screened against the criteria presented in the Parcel B petroleum corrective action plan (Tetra Tech 2001a); Table C-1 will be revised to include TPH criteria.

- b) Footnote q (BGMP Table C-1) says: "POC and sentinel well trigger levels for 1,2-DCE were reduced from 22,400 and 224,000 ug/L, respectively, as listed at Parcel 8 RAMP (Tetra Tech 1999), to a trigger level of 85 ug/L for both wells, because 1,2 DCE criteria are based on human health". Footnote r is similar, with respect to TCE. These footnotes are confusing. They are confusing because they imply that a change was made post-ROD but the trigger levels quoted are ROD trigger levels. Footnote q is also inaccurate since aquatic criteria in the ROD are 113,000 (not 24,000) and 224,000 ug/L for DCE.

In lieu of footnotes q and r, it is preferable to quote footnote "*" of the ROD (Table 10), which says: "Human-health based criteria were developed for VOCs that may represent a human health risk to a future resident at Parcel B. Concentrations of these VOCs in

groundwater correspond to an ELCR [excess lifetime cancer risk] of 10^{-6} and were selected as a groundwater RAO [remedial action objective] for protection of human-health based on groundwater to indoor air modeling analysis".

However, footnote "*" of the ROD is no longer correct: for some VOCs, trigger levels no longer correspond to 10^{-6} ELCR, and may not be sufficiently protective. The Navy should acknowledge this and propose new trigger levels for VOCs which incorporate new toxicological research, especially with regard to inhalation risks.

The footnotes will be revised to clarify that the trigger levels listed for VOCs are the human health criteria from the ROD and that the Navy will propose updated VOC trigger levels in the TMSRA.

- c) Regarding new trigger levels, the Federal Facility Agreement (FFA: Section 7.10 Subsequent Modification of Final Documents, paragraph (a)) says: "Any party may seek to modify a document after finalization if it determines, based on new information (i.e., information that becomes available, or conditions that become known. after the document was finalized) that the requested modification is necessary... by submitting a concise written request to the Remedial Project Managers of the other Parties... The request shall specify the nature of the requested modification and how the request is based on new information." Accordingly, the Navy should explain the need for modification of trigger levels (for VOCs and other compounds, as appropriate) and provide human-health calculations and/or supporting documentation for review by DTSC toxicologists.

The Navy looks forward to proposing updated VOC trigger levels in the TMSRA.

- d) Review of ecological criteria for the protection of the San Francisco Bay is deferred to the RWQCB. Please note that Marshak's 2000 values for RWQCB Central Valley do not apply to the Bay Area. For example, please confirm whether Bay Area values exist for several metals not included in Marshak's compilation (e.g., barium, beryllium, chromium, cobalt, manganese, thallium). Another example: RWQCB requested that the Navy use the bioaccumulation criterion for consumption of aquatic organisms for polychlorinated biphenyls (PCBs): this criterion is .0017 ug/L (which is lower than the BGMP aquatic criteria .03 ug/L).

The Navy has addressed RWQCB comments on ecological criteria for protection of the Bay individually in this and other responses to comments. HGALs provided the basis for the trigger levels for the referenced metals listed in the RAMP, instead of the Marshak values referred to in the comment. The aquatic criteria listed in Table C-1 were

determined by using the equations provided by the RWQCB in comments on the Phase III Parcel C groundwater report (Tetra Tech 2003d). The trigger level of 0.19 µg/L for PCBs is taken from the RAMP (Tetra Tech 1999). The use of bioaccumulation criteria is being discussed with the RWQCB.

7. Comment: Well decommissioning

a) Many wells have been removed at Parcel B and elsewhere on the Hunters Point site. No workplans for well decommissioning have been located in the site file; similarly, closure reports were not located. Well decommissioning has not been reviewed and approved.

Please clarify whether all wells have been properly decommissioned and that California well standards have been met (e.g., grouting to total depths and/or perforation if necessary). Administrative requirements of the permitting process for decommissioning do not need to be met but substantive requirements do. Field forms for decommissioning for each well should be provided which demonstrate that appropriate procedures were performed.

Response: All monitoring wells decommissioned at HPS were under the supervision of a California Registered Geologist. Wells deemed necessary to remove or decommission were abandoned in accordance with California Monitoring Well Standards (Department of Water Resources Bulletins 74-81 and 74-90).

The Navy has not routinely solicited review of well decommissioning procedures as this is considered an administrative requirement. As noted above, substantive requirements have been met.

b) Well standards (Department of Water Resources Bulletins 74-81 and 74-90) can be found at: http://www.groundwater.water.ca.aov/technicalassistance/gw_wells/gww_standards/index.cfm.

No response required.

c) "Planned decommissioned wells" are indicated on figures (e.g., Figure 8A): a workplan should be provided for well decommissioning.

Section 8.2 has been revised to include a subsection on the planned decommissioning of monitoring wells.

d) The text says (Section 8.3.1): "Any wells that cannot be properly repaired will be decommissioned and replaced, if necessary". Please provide a workplan for well decommissioning.

Section 8.2 has been revised to include a subsection on the planned decommissioning of monitoring wells.

8. **Comment:** Methane. Methane has been measured at other site locations in addition to the landfill (IR1/21) during groundwater sampling and in early investigations (Solid Waste Air Quality Assessment Test, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California (SWAT) dated August 4, 1989, and Hunters Point Annex, San Francisco, California (RAR) dated August 9, 1990 (both by Harding Lawson Associates, Inc.). Although IR1/21 has been investigated, other sites have not been fully investigated with respect to methane and other landfill gases (LFG). Additional soil gas investigations might be prudent in areas in or adjacent to residential reuse areas and in disposal areas (e.g., IRO7 and IR18). Instructions to field crews regarding methane (Section 8.3.3.1) should be expanded to include other areas of the site, including Parcel B.

Response: Soil gas investigations are beyond the scope of the BGMP. Note health and safety procedures; photoionization detectors will be used to screen the head space of all wells prior to sampling.

9. **Comment:** Well repair

- a) Unacceptable well conditions have been commonly noted at the site. Well conditions improved with the site-wide well inspection program in 2002. But some problems identified in 2002 have not yet been addressed. Also, the current condition of wells is unknown, since wells have not been inspected since 2002 (with few exceptions). All wells should be inspected at least annually: wells for sampling or groundwater level measurements should be inspected and repaired prior to each field event. Such inspection and repair is proposed in the BGMP for each sampling event (Section 8.3.1): confirm that the inspection and repair also applies to water level measurement wells. Please include completed "Monitoring Well Inspection Forms" in the data evaluation report for the BGMP and update Table F-1 as needed.

Response: The monitoring well inspections discussed in Section 8.3.1 refer to inspections to be conducted by the sampling team at wells where groundwater samples will be collected. Well inspections to be conducted during each quarterly event will include the water level measurement wells. The Navy does not intend to include monitoring well inspection forms in the BGMP data evaluations. Table F-1 will be updated quarterly to reflect changes in well conditions noted during inspection.

- b) Corrective action is requested for the following well conditions identified in Appendix F: IR18MW12A (resurvey); IR10MW14A (provide lock).

The polyvinyl chloride (PVC) riser of well IR18MW21A had been cut during repairs and needs to be resurveyed. Groundwater elevation data from this well will not be used in creating groundwater elevation contour maps until the well is resurveyed. A new lock will be installed at IR10MW14A during the first round of sampling to be conducted under this plan.

Additional Specific Comments

1. Comment: Section 1.1.1 Purposes of the Groundwater Monitoring Program

a) The text says: "The basewide BGMP will also incorporate Year 5 of the Parcel B remedial action monitoring plan (RAMP)". As noted in general comments, it is not appropriate to include RAMP monitoring and modifications in the BGMP. Please delete this statement and all similar statements. But, with respect to site history, please include dates for Year 5.

Response: Please see the Navy's response to DTSC Parcel B general comment 1. The dates for year five of the RAMP have been added to Section 1.1.1.

2. Comment: Section 1.1.2 Problem to Be Solved

a) The text says: "The Navy also wants to include monitoring required under the Parcel B Record of Decision (ROD) (Navy 1997), which has heretofore been documented under its own quarterly monitoring program. As noted in general comments, it is not appropriate to include RAMP monitoring and modifications in the BGMP. Please delete.

Response: Please see the Navy's response to DTSC Parcel B general comment 1.

b) The text says: "At Parcel B, groundwater is monitored under an existing RAMP, which will continue until 5 years of monitoring is completed." Please include date when five years of monitoring will be completed.

Five years of RAMP monitoring will be completed in December 2004. The text in Section 1.1.2 has been revised to include this information.

c) The text says: "Additional wells proposed for monitoring beyond the RAMP requirements are including in this BGMP." The Navy should revise the BGMP so that RAMP wells and requirements are clearly distinguished from other additional wells and proposed additional monitoring.

The text in Section 1.1.2 has been revised to clarify RAMP wells and requirements.

- d) Separate notation should be used on figures for actual RAMP wells. For example, on Figure 4, IR10MW12A is identified as "dual purpose hexavalent chromium and COC monitoring well": but this well is designated as a "VOC monitoring well" in the RAMP.

Please see the Navy's response to DTSC Parcel B general comment 3f.

- e) All "problems" that need to be solved are not addressed in this section or in the BGMP, as indicated in comments.

The text has been revised to state that the Navy looks forward to continuing to discuss Parcel B groundwater issues with the BCT during Year 5 and subsequent monitoring.

3. **Comment:** **Section 1.1.3 Facility Background. Operations of the National Radiological Defense Laboratory (NRDL) on Parcel B (and elsewhere) should be included.**

Response: The text in Section 1.1.3 has been revised to include a historical summary of the National Radiological Defense Laboratory (NRDL) at the site. For a detailed background of the NRDL at the HPS, please refer to the "Draft Final Historical Radiological Assessment, Volume II, Hunters Point Shipyard" (Naval Sea Systems Command 2004).

4. **Comment:** **Section 1.1.5 Site Description. The site description should include the fact that most of Hunters Point Shipyard (including most of Parcel B) was constructed on fill materials (referring to the 1935 shoreline on Figure 3), and that the fill history is largely undocumented.**

Response: The text has been revised as follows: "Prior to filling operations, the shipyard extended out to the 1935 shoreline as it is shown on Figure 3. Today, the acreage of the shipyard is 496 acres with more land area as a result of emplacement of fill material out from the 1935 shoreline. Most of the fill was derived from the Hunters Point Shear Zone Unit of the Franciscan Complex. Rock types of the Franciscan Complex include serpentinite, basalt, greenstone, as well as chert and other sedimentary rocks within the mélange. Fill also included concrete, brick, and wood. Sandblast waste has also been observed as has minor amounts of metal debris."

5. **Comment:** **Section 1.1.6.2 Parcel B Remedial Action Monitoring Plan. This section describes the ROD components of the groundwater remedy: but, the information provided is not sufficient. The ROD (Section 1.4 Description of the Remedy), contains a description of the approach to the groundwater remedy including: sentinel wells, compliance wells, criteria, etc. A description of the ROD approach to groundwater should be included in the text.**

Response: As noted in Section 2.10 of the ROD (Navy 1997), the approach to groundwater monitoring was to be developed and documented in a subsequent document, which is the RAMP (Tetra Tech 1999). The text in Section 1.1.6.2 of the SAP has been revised to note that the ROD deferred details of the groundwater monitoring program to the RAMP. As discussed in Section 4.0 of the SAP, the RAMP groundwater monitoring strategy for Parcel B consists of groups of wells identified as POC wells, sentinel wells, post-remedial action wells, VOC wells, on- and off-site migration wells, and a utility line well, which are monitored quarterly for a defined group of analytes (except for the sentinel wells, which are monitored semiannually). For a detailed description of the RAMP monitoring program, please refer to Sections 1.0 and 2.0 of the RAMP (Tetra Tech 1999).

6. **Comment:** **Section 1.2.1 Project Objectives. Delete references to RAMP replacement wells.**

Response: Please see the Navy's response to DTSC Parcel B general comment 1. Since the RAMP was finalized in 1999, several monitoring wells have been removed as a part of remedial actions to address contaminated soils. These monitoring wells were replaced, and are currently being monitored.

7. **Comment:** **Section 1.6.4 Reports Generated. Parcel B RAMP reporting requirements apply to RAMP wells.**

Response: Please see the Navy's response to DTSC general comment 1; the Navy intends to fulfill all requirements of the RAMP, including determining the monitoring well network to be sampled, identifying the analyte list for each monitoring well, determining analytical techniques, and identifying sampling and reporting frequencies.

8. **Comment:** **Modified low-flow purging (Section 8.3.4.2). Please provide references in support of the modified low-flow purging proposed. In particular, explain how the process is not disruptive to VOCs (i.e., multiple changes in water pressure). Also, explain how the threshold value of .33 foot at 0.15 L/min was determined.**

Response: The Navy has elected to use the low flow-rate purging and sampling procedure described in ASTM International standard D6771-02. Section 8.3.4.2 has been modified to describe this sampling procedure. The basic elements of the sampling procedure are as follows:

Sampling equipment will consist of SS-Mega-Typhoon model pumps with low-flow controllers and dedicated Teflon-lined tubing for each monitoring well. Pumps will be decontaminated between samples by

scrubbing with soapy water and triple rinsing the exterior of the pump with deionized water. The interior of the pump will be decontaminated by pumping soapy water followed by a rinse with deionized water.

Pumping will be initiated at a pumping rate of approximately 0.5 L/min, and slowly adjusted downward until the drawdown in the well stabilizes. The minimum pumping rate will be 0.05 L/min. If drawdown exceeds the maximum acceptable level recommended by ASTM International Standard D6771-02 (25 percent of the distance between the top of the well screen and the pump intake), the pump will be stopped and the well will be allowed to recharge to 80 percent of the pre-pumping equilibrium water level before continuing the purging and sampling procedure.

Well stabilization parameters (pH, electrical conductivity, dissolved oxygen [DO] concentration, and oxidation-reduction potential [ORP]) will be measured periodically at intervals of 5-minutes of pumping or 1 liter of water discharged (whichever is shorter), and recorded on well sampling sheets. In addition, drawdown, temperature, and turbidity will be measured and recorded. Wells will be sampled when well stabilization parameters fall within suggested acceptable ranges detailed in Table 1 of ASTM International Standard D6771-02 (three consecutive measurements within the following ranges: pH ± 0.2 pH units, electrical conductivity ± 3 percent, DO ± 10 percent or ± 0.2 mg/L, whichever is greater, and ORP ± 20 millivolts).

9. **Comment:** **Quality control (QC: Section 8.6) and data validation (Section 10.). Review of QC and data validation is deferred to USEPA.**

Response: The Navy acknowledges this comment.

10. **Comment:** **Table C-1**
a) Change the column title "POC well trigger level" to "Parcel B RAMP POC well trigger level".

Response: Column title "POC Well Trigger Level" has been changed to read "Parcel B RAMP POC Trigger Level," as requested.

b) Footnotes "q" and "r" are discussed above.

Please see the Navy's response to DTSC Parcel B general comment 6b.

11. **Comment:** **Appendix G**
a) Please revise Figures G-1 and G-2 (which show wells selected for groundwater level monitoring) to include all site wells so that the reviewers can properly evaluate the proposed program and make recommendations for additional or different wells to be included.

Response: All wells are shown on Figures G-1 and G-2. Please see the Navy's responses to EPA's specific comment 5 and EPA's Appendix G specific comments 4, 5, 6, and 7.

- b) There are many discrepancies between figures with regard to decommissioned wells, especially in Parcel B. In addition, on Figure G-1, all wells are not included, all well names are not included, all removed wells are not noted as such (e.g., near IR07MW29A). On Figure 3, some well names are "floating" on the figure-unassociated with well locations (especially in the eastern portion). As a result, it is not possible to fully review the program for water level measurements in Parcel B.**

Discrepancies between figures have been resolved. Although Figure G-1 shows all A-aquifer wells, names are not provided for wells not selected for groundwater level measurements.

- c) Groundwater flow in two regions of Parcel B is controlled by a mound and a sink. Changes to the sanitary system pumping regime will affect these features, as discussed above. The Navy should determine the causes (e.g., blocked and submerged storm lines, interconnected storm/sanitary lines) of mounds and sinks, including the trough between IR06 and IR25 and the large elliptical mound in the eastern portion of Parcel B.**

Please see the Navy's response to EPA specific comment 3 and EPA's Appendix G specific comment 2. The groundwater mound at IR-20 and the trough at IR-06/IR-25 have been consistently observed throughout the RAMP monitoring and groundwater levels will continue to be monitored in these areas. Need for repair work to utility systems will be assessed based on observed changes in groundwater elevations and groundwater flow patterns.

- d) The Navy should assess the impacts of utility repairs (if any) on groundwater flow.**

Please see the Navy's response to EPA specific comment 3 and EPA's Appendix G specific comment 2. Need for repair work to utility systems will be assessed based on observed changes in groundwater elevations and groundwater flow patterns.

- e) Vertical and horizontal gradients and flow directions will not be determined by the proposed program. Only two B-aquifer wells exist in Parcel B, on IR18, near the western boundary: these two wells (IR18MW100B and 101B) are not sufficient to determine horizontal gradients and flow directions. Also, they are not paired with shallow wells so vertical gradients can not be determined.**

Please see the Navy's response to DTSC Parcel B general comment 3d. The occurrence of a widespread B-aquifer zone at Parcel B has not been demonstrated. Although the Final Parcel C, Phase III, Groundwater

Summary Report (Tetra Tech 2003d) shows upper and lower A-aquifer zones directly above bedrock in the IR-06/IR-25 area near eastern Parcel B, it does not identify a separate B-aquifer.

- f) The B-aquifer under Parcel B may be separated into 2 zones (e.g., at IR18 and at IR10) by subsurface bedrock ridges. If so, both zones of the B-aquifer may need to be investigated separately (i.e., with respect to chemical analysis, gradients, properties, etc.)**

The notion that bedrock ridges may separate the B-aquifer into separate units at Parcel B has not been substantiated. The Navy does not propose to modify the monitoring program agreed to in the RAMP (Tetra Tech 1999) by installing and sampling monitoring wells in new locations.

- g) At IR10, a VOC site and potential DNAPL site, the B-aquifer underlying the hole in the aquitard at IR10 has not been investigated and no B-aquifer wells exist. Vertical and horizontal gradients have not been determined. And, it has not been determined if contamination (dissolved and DNAPL) has migrated to deeper zones.**

Please see the Navy's response to DTSC Parcel B general comment 3d.

- h) More wells are required to monitor the Parcel B boundary (near removed well IR07MW28A).**

IR07MW28A has not been removed. Table F-1 and Figure G-1 have been revised to correct this error. Regarding the need for more wells in this area, please see the Navy's response to DTSC Parcel B general comment 1. The Navy may consider the need for additional monitoring wells as part of the 5-year evaluation dictated by the 1997 ROD (Navy 1997).

- i) Two wells for IR06 for water level measurement (IR06MW22A and 49F) are shown as decommissioned on Figure G-1. Why were these wells removed? Replacement wells should be considered.**

Neither well IR06MW22A nor IR06MW49F have been decommissioned. Figure G-1 and Table F-1 have been revised to correct this error.

- j) Another well for water level measurement should be considered east of IR25MW16A. Repaired water lines are shown on Figure 3.**

IR25MW50A, located east of IR25MW16A, has been added to the list of wells selected for groundwater level measurement. Table G-1, Figure G-1, and text referencing the number of wells included in the basewide groundwater level measurement have been revised.

- k) At treatability study (TS) areas, a denser distribution of monitoring points for groundwater level measurement is necessary--especially at pumping or injection areas. For example, at IR10 in Parcel B, nine wells have been removed surrounding Building 123 and six new wells have been installed inside and adjacent to Building 123, but few wells are selected for water level**

measurements. More wells should be selected for groundwater level measurements: at a minimum, please include "VOC monitoring wells," "dual purpose well," and "ZVI (zero-valent ion) VOC monitoring wells."

Please see the Navy's previous responses to DTSC Parcel B general comments 3f, g, and h. The only monitoring well at Parcel B designated as a VOC monitoring well is IR10MW33A, and groundwater levels will be measured in this well. Groundwater levels will also be measured in dual-purpose hexavalent chromium and VOC monitoring well, IR10MW12A. As indicated in Navy's previous responses to DTSC Parcel B specific comments 3f and 3g, ZVI study VOC monitoring wells have been redesignated as "supplemental characterization wells." The Navy has agreed to measure groundwater levels at the following supplemental characterization wells at IR-10: IR10MW59A, IR10MW61A, IR10MW79A, and IR10MW80A. Figure G-1 and Table G-1 have been revised to indicate that groundwater elevations will be measured at these wells.

DTSC SUMMARY OF MAJOR ISSUES ON DRAFT SAP RECEIVED ON MARCH 18, 2004

1. **Comment:** Volatile Organic Compounds (VOCs). Because VOCs present an inhalation risk more complete and extensive characterization is needed for plumes with VOC contamination. For example, the interiors of VOC plumes must be investigated in order to complete human-health risk assessments.

Response: The Navy believes enough data have been collected at the interior of VOC plumes to develop alternatives that protect human health and the environment. The interiors of the VOC plumes will be evaluated, but it is anticipated that data from the lateral edges will be more useful to estimate the area where potential health risks may be present.

2. **Comment:** Contaminants of Potential Concern (COPCs) Screening Criteria. We seek a basic agreement that compounds exceeding risk-based criteria (human and ecological) shall be included as Contaminants of Potential Concern. In general, it is too early in the process to eliminate COPCs. Moreover, the process used by Navy in eliminating compounds is not clear. Table C-1 simply identifies Project Required Detection Limits and includes an incomplete list of compounds. Please clearly explain the process for selecting/eliminating COPCs. In addition, please include a statistical table. On the table, include at the minimum all compounds analyzed for at Hunters Point; risk-based criteria (human-health and ecological); the range of concentrations measured for each compound; then number of analyses; and the number of detects. Also indicate whether the detection limits were greater than

risk-based criteria for each compound (i.e. indicate the number of non-detects above risk based criteria).

Response: In the SAP, the Navy has provided rationale for the selected analytes for each well. These selections are based on the Navy's evaluation of the need for additional analytical data and are not a screening of COPCs. Exclusion of an analyte from a particular well under this BGMP does not mean that the Navy has screened out that chemical. For example, if the Navy believes that the existing data at a particular well for a particular chemical are sufficient, then that chemical may be excluded from analysis in samples from that well.

3. **Comment:** **Data Quality Objectives (DQOs) for monitoring groundwater chemicals not associated with plumes at Parcels C, D, and E. Step 5 of the DQOs (and footnote c in Tables 7J, etc.) states that groundwater sampling is not proposed if "no source is identified". DTSC can not accept this blanket rule. Groundwater contamination without an identified source may require further investigation.**

Response: This data quality objective (DQO) applies only to metals analyses and is meant to eliminate monitoring of naturally occurring metals in groundwater. The Navy agrees that elevated levels of organic compounds exceeding screening criteria may require further investigation whether or not a source is identified. However, due to the ubiquitous high concentrations of inorganic metals associated with the native serpentinite minerals, the Navy does not believe that further investigation is needed in areas associated with elevated metal concentrations where no source has been identified.

4. **Comment:** **Sanitary Sewer System. As sections of the sanitary sewer system are shut down or repaired, significant adjustments in groundwater levels and flow directions are expected. DTSC requests the Data Quality Objectives for groundwater measurements be amended to account for the planned changes in the sanitary sewer system. Please include in the groundwater level measurement program specific actions necessary to monitor these anticipated changes.**

Response: The current groundwater level monitoring program will provide adequate data with which to recognize potential changes in groundwater flow patterns. The DQOs specify collection of quarterly water level data and evaluation of groundwater flow based on each quarter's data. In the event that flow pattern changes are recognized and considered to be the result of utility system alterations, then the Navy will evaluate the need for modifications to the groundwater elevation network. The Navy believes that the DQOs are adequate.

General Comments

1. **Comment:** Significant effort. The BGMP presents a very significant sampling effort which will advance the understanding of groundwater flow and contaminant distribution and provide a more solid foundation for feasibility study (FS) discussions and decision-making.

Response: The Navy acknowledges the significance of the BGMP.

2. **Comment:** Comments by other parties. DTSC agrees in general with comments provided by the Regional Water Quality Control Board (RWQCB), United States Environmental Protection Agency (USEPA), the City and County of San Francisco, and Arc Ecology. Similar comments are not repeated here.

Response: The Navy acknowledges this comment.

3. **Comment:** Pump Station A and other sanitary and storm system effects on groundwater

- a) Pump Station A of the sanitary system has been functioning as a de facto pump and treat system for several decades, controlling flow over most of Parcels D and E. The effects of sanitary system pumping on Parcels B and C may also be significant. The Navy says (response to comments on the Phase III DGI, page 70): "Given the antiquated nature of the utility systems at HPS, the Navy assumes that all systems will be removed and replaced during site development". (Emphasis added). As development proceeds and the systems are replaced, flow directions and gradients will be altered. Contaminant plumes and migration patterns will change accordingly. Please include effects of changes in the pumping regime and other changes to the sanitary and storm systems in the data quality objectives (DQOs).

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 4.

- b) In the BGMP, please discuss any anticipated near-term changes to the pumping regimes (and other activities in the sanitary and storm systems) and demonstrate that the proposed program is sufficient to monitor such changes.

Quarterly monitoring of the proposed groundwater elevation network will provide adequate data to recognize potential changes in patterns of groundwater flow. In the event that changes in the pattern of flow are recognized and considered the result of alterations to the utility system, the Navy will evaluate the need to modify the groundwater elevation network.

Additionally, the Navy is working with the HPS Caretaker Site Office (CSO) in order to identify repairs. Identified repairs will be shown on quarterly groundwater elevation maps. The Navy will also evaluate changes to the sanitary sewer system at that time.

- c) **Evaluate changes in groundwater flow and contaminant migration (which are due to changes in the pumping regime and sanitary and storm systems) in reports pursuant to the BGMP.**

Any changes in groundwater flow and contaminant migration will be discussed in the annual basewide groundwater monitoring reports.

- d) **Anomalous mounds and sinks also have a decided effect on the current flow regime (as discussed in DGI comments and in Appendix G comments, below). Evaluate any impacts on mounds and sinks due to changes in the pumping regime and other changes to the sanitary and storm systems in reports pursuant to the BGMP and make recommendations for continued monitoring.**

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 3c.

4. **Comment:** **Migration to the Bay. As development proceeds and pumping regimes are changed (i.e., decrease in pumping rates or areas of influence), flow towards the Bay will likely increase. Ecologically-sensitive compounds on the bay margin may move towards the Bay. Please include continued monitoring of such compounds near or adjacent to the Bay in the DQOs, and demonstrate that the proposed program is sufficient to monitor anticipated changes.**

Response: As development proceeds and pumping regimes are changed, the BGMP will be adjusted as necessary.

- 5a. **Comment:** **Volatile organic compounds (VOC). VOCs in the groundwater will be risk drivers, since very low concentrations in groundwater may result in unacceptable inhalation risks. Moreover, since many areas with VOC contamination are in or adjacent to residential reuse area, concern regarding potential inhalation risks is elevated. Therefore, careful delineation and monitoring of plumes is required. Since VOC plumes may be impacted by changes to pumping regimes (and other activities on the sanitary and storm systems), additional monitoring is strongly recommended in areas that may be impacted.**

Response: Because of the concern for indoor vapor intrusion risk, VOC plumes have been defined using all detections of VOCs. The Navy believes that the monitoring proposed in the BGMP is sufficient.

5b. **Comment:** VOC contamination in groundwater (i.e., "plumes") should be delineated to updated lower criteria for inhalation risks (e.g., the Navy's estimate was 5 ug/L for TCE at IR10), or to non-detect levels, whichever is lower. In scoping meetings for the BGMP, it was agreed that all organic plumes (including VOCs) would be defined to non-detect levels. Please confirm that all wells needed for this level of plume definition for organics have been included in the BGMP. Please revise "evaluation" criteria for VOCs and other organic compounds accordingly (Table C-1).

Response: As agreed in BCT scoping meetings for the BGMP, VOC plume areas have been defined based on the aerial extent of VOC detections, regardless of concentration. As stated in Section 3.1, existing wells in Parcels C, D, and E were selected around the edges of the known plume (upgradient, downgradient, and crossgradient), or new wells were proposed, to meet this requirement. After four quarters of monitoring have been conducted, the groundwater monitoring network for each plume will be evaluated and may be adjusted to better define the plume, if necessary. For Parcel B, the Navy will propose plans in the TMSRA to delineate plumes of VOCs to reporting limits, including a 100-foot buffer zone.

6. **Comment:** Criteria

a. The Navy and the agencies have not agreed on selection of screening (or "evaluation") criteria for various soil and groundwater investigations, including this BGMP. In some cases, agencies have requested more protective screening criteria which have not been used by the Navy (some examples are provided below). As a result, the list of contaminants of potential concern (COPCs) may be incomplete (see 16, below). Also, data gaps may still exist.

Response: As stated in Section 1.1.8, final criteria that will be used to evaluate groundwater contamination will be determined in the revised FS reports for Parcels C, D, and E and in the TMSRA for Parcel B.

b. Please provide a separate table listing all "evaluation" criteria (with additional information, as requested in the following comments). From the group of possible criteria, the most protective human-health and ecological criteria should be selected as "evaluation" or "screening" criteria—and bolded on the table, for ease of reading. Only the most protective criteria should be compared to PQLs in Table C-1: Comparison of Project-Required Quantitation Limits (PQLs).

The lowest human health and ecological criteria are not always applicable for the BGMP, and thus they are not necessarily subject to comparison with the project-required quantitation limits. For instance, an HGAL is

sometimes used as the evaluation criterion for metals. The revised FS reports for Parcels C, D, and E, and the revised ROD for Parcel B will contain more comprehensive listings of criteria. The Navy has chosen evaluation criteria that are likely to be the lowest remedial goals based on a human health drinking water pathway (MCLs or HGALs) and ecological exposure pathways (aquatic criteria or HGALs). The Navy will delineate VOC plumes to the detection limits of the contaminants of concern.

- c. **Compounds above risk-based criteria (e.g., human-health and ecological criteria) should be presented and evaluated. Risk-based screening criteria were used in remedial investigations (RIs) at Hunters Point, but have not been used by the Navy in recent investigations. Please include additional health-based criteria on the new table requested above—for example, the USEPA's preliminary remedial goals (PRGs) for drinking water and the California Department of Health Services's (DHS's) Public Health Goals (PHGs).**

Please see the Navy's responses to DTSC Summary of Major Issues on Draft SAP General Comment general comments 6a and 6b.

- d. **With respect to VOCs, maximum contaminant levels (MCLs) are identified as "evaluation criteria" in Table C-1. MCLs are not sufficient since MCLs are not strictly health-based criteria and MCLs for VOCs do not include all relevant pathways. In particular, pathways of vaporization from soil-to-indoor air and from groundwater-to-indoor air are not included in MCLs.**

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 6b.

- e. **DTSC defers to the Regional Water Quality Control Board (RWQCB) with respect to ecological criteria. The RWQCB's recommended approach to developing ecological criteria was presented in a letter dated July 3, 2003. On the new table requested above, please demonstrate that the RWQCB's approach has been followed. For example, for a given compound, list all criteria on the RWQCB's letter which apply for that compound, and indicate (by bolding) the more-protective criterion which has been selected as the "evaluation" criterion.**

It is evident that the Navy has not followed the RWQCB's recommended approach for all compounds. Example: RWQCB requested that the Navy use the bioaccumulation criterion for consumption of aquatic organisms: for polychlorinated biphenyls (PCBs), this criterion is .0017 ug/L (which is lower than the BGMP aquatic criteria .03 ug/L).

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 6a. The Navy believes that consumption of aquatic organisms may be applicable to Parcel F, but not to groundwater at HPS.

- f. **Other issues regarding criteria from former comments have not been addressed in the BGMP. For example, human-health criteria are not proposed for all COPCs. Examples: human health-based criteria are not provided for iron (the 2002 tap water PRG is 11,400 ug/L), manganese (the 2002 tap water PRG is 880 ug/L), or for asbestos (the MCL is 7 fibers per liter).**

Another example: a human-health criterion is not provided for hexavalent chromium (CrVI). At this time, controversy regarding an appropriate human-health criterion is being resolved. In 2001, DHS proposed a PHG of 2.5 ug/L. Recently, the PHG was withdrawn: and, long-term and short-term studies were initiated to resolve issues raised during PHG review. MCLs are based, in part, on PHGs and DHS is mandated to develop a California MCL by 2004. So, a human-health criterion (i.e., the PHG) will be developed and an MCL will be promulgated in the near future, while the BGMP field work is still in progress. It would be prudent for the Navy to adopt a conservative (i.e., lower) evaluation criteria for CrVI.

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 6a. The Navy will consider new criteria for hexavalent chromium when it is developed.

- g. **The Navy should identify compounds detected on site for which appropriate criteria (both health-based and ecological) have not been proposed: the agencies will provide input to determine appropriate criteria (e.g., organotin).**

Please see the Navy's response to Summary of Major Issues on Draft SAP general comment 6a, above. Table C-1 in the SAP identifies chemicals that have no MCL and chemicals for which the Navy has not identified an aquatic criterion. The final criteria that will be used to evaluate groundwater contamination will be identified in the revised FS reports for Parcels C, D, and E, and in the TMSRA for Parcel B.

7. Comment: Utilities in the landfill

- a. **Utilities in or adjacent to the landfill need to be investigated and removed so that they do not serve as preferential pathways for groundwater, surface water, and landfill gases (LFG).**

Response: Investigation or removal of utilities will not be part of the BGMP but may occur as part of other removal actions or investigations in the future. The CSO has recently been overseeing repair work on the sewer/stormwater

utilities lines throughout the base. Figures will be revised in the annual reports to identify utility repairs, as necessary.

- b. The location of the utility line which was encountered during installation of the Gund™ curtain should be included on figures. Please identify the type of utility line it was. Also, please clarify whether the utility was a known utility line, or a newly-discovered utility line. Methane exceedences have recently been measured in this general area.**

A 10-inch steel line was discovered during the TCRA for landfill gas. This line was not noted on available historical utility maps, and its former purpose could not be determined. A 20-foot section of this line was removed during installation of the Gund curtain. The line that remained in the ground was plugged and the excavation was backfilled. This line was discovered near the west end of the wall, just south of GMP-11/GMP-11A. Recent monitoring of GMP-11A (i.e. since installation of the Gund curtain), have not shown evidence of elevated methane concentrations at this locations (the highest concentration detected was 0.1 percent methane by volume). The location of this line has been added to Figure 11.

- c. Locations of utilities should be shown on figures--along with locations of existing gas and groundwater monitoring and extraction systems. Indicate all submerged lines (including salt water lines).**

All known utilities near the landfill are shown on Figure 11, with the exception of the inactive utility line discovered during the removal action.

- d. Clarify whether salt water lines are submerged in the vicinity of the landfill. Show all submerged utilities on figures.**

All known submerged utility lines are shown on Figure 11.

8. Comment: Sources

- a. Recent data on soil sources has not all been received and reviewed, including data from data gaps investigations (DGIs) and treatability studies (TSs). Therefore, groundwater data gaps associated with soil sources may still exist. Also, because TS results for several VOC plume areas have not been reviewed (e.g., at IR10, RU-C1, RU-C2, RU-C4), it was not possible to fully evaluate whether monitoring wells selected are optimal monitoring locations in TS areas. For example, near RU-C2, tetrachloroethene (PCE) has increased in IR29MW85F: is this increase related to TSs in the area?**

Response: Analytical data for soil and from the treatability studies will be presented in treatability study reports. The Navy provided information on characterization of groundwater contaminants in the GDGI reports and has designed the proposed BGMP to monitor recognized contaminants in

groundwater. The Navy will continue to monitor for chemicals of concern identified in groundwater as a result of past industrial operations at HPS. Any additional source areas that may be identified in the future will be addressed when they are discovered.

- b. **To facilitate the evaluation of whether groundwater monitoring of soil source areas is adequate, remedial investigation (RI) figures should be updated to show the full extent of all source areas. Information has been provided on some figures (e.g., underground and above ground storage tanks (USTs and ASTs), removal action areas (RAs)), as requested. Additional source areas should be shown, including: sandblast grit areas (storage and disposal), and areas of oily waste disposal, areas with non-aqueous phase liquids--both dense (DNAPLs) and light (LNAPLs). Potential source areas directly adjacent to Hunters Point should also be shown on figures.**

Please see the Navy's response to Summary of Major Issues on Draft SAP general comment 8a.

- c. **Although the full extent of asbestos at the site has not been determined, existing data should be summarized and presented.**

The Navy does not intend to monitor groundwater for asbestos. Asbestos is a naturally occurring in serpentinite.

- 9. **Comment: Discharge points. All current and historic discharge points for the industrial, storm, and sanitary systems should be identified and evaluated as potential source areas, since combined systems were used for most of the site's tenure and since interconnections are believed to still exist.**

Response: Sanitary sewer lines and storm drain lines and the portions of these lines that are beneath the water table are shown on the numerous chemical concentrations maps in the Phase III GDGI reports. Those reports also evaluate the potential for these lines to intercept and transport contamination to the Bay.

- 10. **Comment: Other data gaps. Multiple areas were excluded from consideration by the Navy during the data gaps investigations--e.g., IR52, the large ship shielding area in the western portion of the site, and formerly used defense sites (FUDs). Data gaps still exist in areas that have not been fully investigated.**

Response: The former ship shielding area (IR-52), located between monitoring wells IR01MWI-9 and IR01MW62A on the panhandle of IR-01/21, will be addressed in the draft final historical radiological assessment (HRA), and the Navy will take appropriate response actions based on the findings of the HRA. The Navy has proposed groundwater sampling at four wells located around the perimeter of the former ship shielding area: IR01MWI-6, IR01MWI-7, IR01MW58A, and IR01MW62A. Please refer to Figure 11 and Table 7-I. IR01MWI-6 will be sampled for beryllium, cobalt, vanadium, PCBs, cyanide, and TSS. IR01MWI-7 will be sampled for total metals, VOCs, SVOCs, and TSS. IR01MW58A will be sampled for VOCs, SVOCs, PCBs, and TPH. IR01MW62A will be sampled for vanadium, VOCs, SVOCs, cyanide, and TSS. IR-52 will be addressed in the revised Parcel E RI/FS.

Please note that formerly used defense sites are managed by the US Army Corps of Engineers.

- 11. Comment:** Possible holes in the aquitard. Bay Mud thins at various locations (to as little as 4 feet), which suggests that the aquitard may be ineffectual or actually absent in some areas (which were previously considered to have confining layers). Some areas have been discussed (e.g., RU-C2 in Section 2.3.2.2), but other areas have not (e.g., several potential holes are indicated on P3GDGI, Figure 3-2C, cross section G-G'). Areas where the aquitard thins to ten feet or less should be identified by the Navy and evaluated to determine whether holes in the aquitard exist and whether migration to the B aquifer has occurred. DQOs should be amended accordingly.

Response: The Navy believes that the hydrostratigraphic relationships are adequately defined in the Phase III GDGI reports. The Navy has proposed additional wells in some cases to monitor the potential for contaminant migration where the aquitard between the A- and B- aquifers is absent.

- 12. Comment:** Groundwater level monitoring program
- a. The proposed groundwater level monitoring program for the A-aquifer is a significant improvement and is generally sufficient (exceptions noted below and in Appendix G comments).

Response: The Navy acknowledges this comment. Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 12d.

- b. The groundwater level measurement program proposed for other aquifers is not fully adequate as discussed in the detailed comments for Appendix G, below.

The Navy acknowledges this comment. Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 12d.

c. Please include all sampling wells in groundwater level monitoring.

It is not necessary or practical to include every monitoring well sampled in the set of wells for groundwater level measurements. There are set procedures for each groundwater sampling event and groundwater level measurements that would compromise these events if they were combined. Groundwater levels will be measured in all monitoring wells proposed for sampling when the wells are sampled and as part of the sampling protocol. The monitoring wells selected for the basewide groundwater level measurement event will provide a substantial data set to characterize groundwater flow.

d. Please include all paired wells in the groundwater level monitoring program so that vertical gradients can be determined. This is especially critical given the expected changes to the sanitary system pumping regime (as discussed above). For example, paired wells at IR28 which are not included are: 353A (pair: 353B), 400B (pair: 170A), and 334A, 136A, and 314B (well pairs in center of TS area). And, the paired well to 173B is not included (the well name is not shown on Figure G-1).

Table G-1 and Figures G-1 and G-2 have been revised to include all well pairs for water level measurements.

13. Comment: Well Decommissioning

a. Many wells have been removed on the Hunters Point site. However, well decommissioning has not been reviewed and approved (with a few exceptions).

Response: All monitoring wells decommissioned at HPS were under the supervision of a California registered geologist. Wells deemed necessary to remove or decommission were abandoned in accordance with California Monitoring Well Standards (Department of Water Resources Bulletins 74-81 and 74-90).

The Navy has not routinely solicited review of well decommissioning procedures as this is considered an administrative requirement. As noted above, substantive requirements have been met.

b. Please demonstrate that all wells have been properly decommissioned and that California well standards have been met (e.g., grouting to total depths, perforation if necessary, etc.). Administrative requirements of the permitting process do not need to be met but substantive requirements do need to be met.

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 13a.

c. Well standards (Department of Water Resources Bulletins 74-81 and 74-90) area at:

http://www.groundwater.water.ca.gov/technical_assistance/gw_wells/gww_standards/index.cfm.

All geological and hydrogeological investigations at HPS are supervised by California Registered Geologists. California Well Standards are one set of criteria that are routinely used.

- d. **Please include completion logs for each decommissioned well. Completion logs for all wells should be compiled and included on a compact disc which includes the well construction and corrective action information (Table F-1) and boring logs. This data is required for property transfer and will facilitate document review and data evaluation. The CD should be updated on an on-going basis and re-submitted with major documents and data transmittals.**

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 13a. A CD will be generated, but not as part of the work done under this BGMP.

- e. **"Planned decommissioned wells" are indicated on figures (e.g., Figure 8A): decommissioning is not addressed in these comments on the BGMP. A workplan should be provided for well decommissioning.**

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 13d.

14. Comment: Data Quality Objectives (DQOs): Tables 3A to 3G

- a. **Table 3B: DQOs for Chemicals not Associated with Plumes at Parcels C, D, and E, (**
 - i) **Step 5 of the DQOs (and footnote c in Tables 7J, etc.) says that groundwater sampling is not proposed if "no source is identified". This rule is not acceptable: please delete the rule (and similar statements) from the DQOs and elsewhere in the BGMP. Contamination in the groundwater demonstrates that a source exists. If a source has not been found (i.e., "identified"), additional soil and groundwater investigation may be required (see parcel-specific comments, below).**

Response: This DQO applies only to metals analyses and is meant to eliminate monitoring naturally occurring metals in groundwater. Due to the ubiquitous high concentrations of inorganic metals associated with the native serpentinite minerals, the Navy does not believe that further investigation is needed in areas associated with elevated metal concentrations where no industrial source has been identified.

- b. **Table 3C: DQOs for Groundwater Level Measurements**

- i) Monitoring of changes to the pumping regime of the sanitary system should be included as a problem (Step 1). Information on such changes should be included as inputs to the decisions (Step 2).**

In the event that alterations to utility systems affect groundwater flow, then the Navy will continue to characterize groundwater flow, as indicated in the first bullet item of Step 1. In addition, the Navy will evaluate whether the understanding of general groundwater flow is adequate to evaluate remedial options for the revised FSSs, as indicated in Step 2.

- ii) Step 5 (Develop Decision Rules) seems to imply that if new data is consistent with historic data, new figures will not be provided: this step is not acceptable. New figures should be provided, as a standard practice. Updated figures are especially important because the proposed program is more comprehensive than previous programs, and because changes to the pumping regime are planned.**

Section 1.6.4 indicates that new potentiometric and limited chemical concentration maps will be created and submitted with each quarterly report. Step 5 in Table 3C discusses the maps that will be used for the FSSs. Regardless of the maps that are used for the FSSs, potentiometric and limited chemical concentration maps will be submitted with the quarterly reports.

- iii) As noted above, since many changes to the pumping regimes are anticipated, and since such changes will likely effect contaminant migration, additional work may be required (e.g., see comments 3 and 15). Decision rules should be changed accordingly (e.g., in Step 5).**

The decision rules in Step 5 allow for modification to the hydrogeological conceptual model based on changes to patterns of groundwater flow.

c. Table 3D: DQOs for Characterizing Nonaqueous Phase Liquids

- i) Soil and soil gas data should be included as inputs to the decision (Step 3).**

The eighth bullet item in Step 3 on Table 3D already includes analytical data for soil from Parcels B, C, D, and E. An additional bullet item has been added to Step 3 on Table 3D that indicates available soil gas data will be considered as inputs to the decision.

- ii) Migration of DNAPL is controlled by density gradients and topology of less permeable surfaces (e.g., upper surfaces of bedrock and clay zones): such information should be added as inputs (Step 4), and evaluation of potential pathways should be included as a problem (Step 1).**

Inputs to the decision are listed as Step 3, not as Step 4. Step 3 includes both hydrogeological conceptual models and fate and transport information that would collectively include DNAPL migration as it relates to less-permeable surfaces.

- iii) "Identification of applicable remedial technologies" (Step 5) for LNAPL and DNAPL should not be included as a decision rule for a groundwater monitoring plan. Such analysis is appropriate to an FS. Please delete.**

Step 5 of Table 3D has been revised so that it does not imply that applicable remedial technologies would be identified separate from the FSs. Remedial technologies for nonaqueous-phase liquid (NAPL) will be identified in the FS.

- iv) Existing figures (e.g., RI figures) should be updated to show the present known full extent of DNAPL and LNAPL. Information from other soil and groundwater investigations should be retained and included (e.g., soil borings, hydropunches, trenches as well as depths measured or seen observed in wells), as in the RI (e.g., extent of product in soil as shown on Figure 4.5-6 at IR03).**

The information requested is presented in the Phase III GDGI reports. Figures in the Phase III GDGI for Parcel C (Tetra Tech 2003d) and for the oil ponds from the Parcel E Phase III report (Tetra Tech 2003e) show locations of monitoring wells where NAPL has been observed. Figure 13 and Section 7.3 of the final SAP have been updated with data obtained during a NAPL investigation at the oil ponds area during the fall of 2003. Measurements of DNAPL and LNAPL will be included in the quarterly reports.

- v) Since soil contamination by NAPL has been indicated at depths significantly below the water table, the decision rule to survey only wells "where the screen intersects the water table" is not sufficient: areas of impact will be under-estimated. At a minimum, all wells with previous detections in soil or groundwater should be included.**

The reference to wells where the screen intersects the water table in Table 3D is in Step 7, Optimizing the Sampling Design. It describes the procedure to assess the presence of LNAPL in particular and not NAPL in general. The Navy will check for NAPL in all wells that are gauged in the water level measurement events.

d. Table 3E: DQOs for Parcel B

- i) RAMP work should not be included in the BGMP: RAMP work should be conducted as per the FFA and existing remedial design (RD) documents (i.e., not as part of the BGMP).**

The Navy has combined the sampling and reporting aspects of the RAMP with the BGMP for increased efficiency of fieldwork and document preparation and review.

- ii) **“Modifications” to the RAMP sampling design (Step 7) must be proposed in a RAMP revision. Work that is not specified in the RAMP should be presented in the BGMP as “additional work” performed supplemental to the RAMP, not as RAMP modifications.**

The text of Step 7 in Table 3E has been revised to replace the word “modifications” with “additional work.”

- iii) **The requirements of the RAMP are not “decisions” (e.g., Step 5) to be made in the context of this BGMP: “decisions” regarding whether or not “remedial actions” will be taken should be deleted.**

The “decisions” listed in Table 3E restate the objectives of the RAMP in the EPA DQO format required for all HPS SAPs. However, the text of Step 5 in Table 3E has been revised to delete all decisions about remedial actions.

- iv) **Step 7 should discuss proposed optimizations to the specific additional work proposed in the BGMP—not historic changes to the overall sampling approach in Parcel B or anticipated future revisions of the RAMP in the 5 year review.**

Step 7 in Table 3E has been revised to delete references to historical changes and the 5-year review. Step 7 will also be revised to state that the work proposed for Year 5 is to install and monitor five replacement RAMP wells in IR-07.

- v) **Other areas of concern have been identified in Comments on Parcel B (previously provided) and are not repeated here. For example, the extent of the hexavalent chromium plume should be identified as a problem (not just the concentrations in IR10MW12A). The “additional decisions” should be discussed more fully in the text. Revised toxicological data should be included as a problem (Step 1) and as an input (Step 3), especially with regard to inhalation risks. Ecological criteria may also need to be updated.**

Please refer to the Parcel B groundwater evaluation technical memorandum (Tetra Tech 2001b) for a discussion of hexavalent chromium in groundwater at IR-10. There is no indication of a “plume” of hexavalent chromium at IR-10. The “additional decisions” described in Table 3E will be discussed more fully in the TMSRA, to be submitted to the BCT in November 2004. All criteria in the RAMP will also be comprehensively evaluated in the TMSRA.

e. **Table 3F: DQOs for B-aquifer Hydrogeology**

- i) **The title of the table should be changed to DQOs "...for B-Aquifer Hydrogeology at RU-C1" (emphasis added), since the work proposed in Table 3F has a very narrow focus.**

The title to Table 3F has been revised to "Data Quality Objectives for B-aquifer Hydrogeology at RU-C1."

- ii) **The designation "shoreline wells" is used in text and tables as though "shoreline wells" is some special category. However, shoreline wells are not explicitly defined and described. Please include DQOs for shoreline wells with rationales, analytes and criteria for ecological protection, and well construction requirements.**

The term "shoreline wells" is a generic description for wells that are near the shoreline. DQOs are not necessary for these monitoring wells, which do not necessarily share anything other than proximity to the bay.

15. **Comment:** **Dilution of the sanitary system by groundwater. "Massive dilution" of the sanitary system by groundwater was not "speculation" on the part of DTSC, nor was it DTSC's conclusion, as stated by the Navy in response to DTSC's comments on the Phase III Groundwater Data Gaps Investigation (P3GDGI, 16 and 17a (pages 66 and 67), and specific comment 1 (page 80)). Rather, it was the conclusion of field investigations and detailed quantitative engineering reports—in particular, Utility Technical Study (UTS): Volume V, Sanitary Sewer System and Volume VI, Storm Drain System (YEI Engineers, Inc., April 1988 and December 1988). Field measurements, calculations, and computer modeling printouts which support the conclusions are included in the UTS.**

The importance of groundwater infiltration is emphasized repeatedly in the UTS. Leakage from the storm water system to the groundwater and subsequently to the sanitary sewer system comprises the majority of the wet-weather flow. Infiltration from groundwater to the sanitary system was quantified. For example, infiltration of groundwater for "normal wet-weather flow" was calculated to be 78.2% of the total flow (Volume V, Appendix Part A, Table E). Infiltration during "maximum wet-weather flows" was 87.8% of the total flow—for a five year storm. Clearly, these effects are "dramatic". For a 100-year storm, or an El Nino event, these percentages would increase.

The following quotes are taken from UTS, Volume V, Section 2: "overall condition of the existing sanitary sewer system can be described as poor...many sags or dips...broken joints, eroded pipe bottoms, infiltrations points, damaged manholes, and construction

deficiencies”; “heavy groundwater infiltration during wet weather season..” Section 2.4: “Groundwater infiltration into the sanitary sewer system, as was said before, appears to play an extremely important role at Hunters Point Annex. The video scanning...confirm that the sewers are leaky and infiltration water indeed massively enters the system.” “The primary factors affecting the sanitary system are substandard velocities and ground water infiltration.” “Ground water infiltration is costly ... Again, excessive ground water infiltration was found to be pervasive throughout much of the annex’s sewerage system. In some areas, sewers and manholes act as true infiltration galleries.” “It can be readily seen, that infiltration components heavily outweigh the strictly sanitary/industrial sewage component at the present time. Infiltration is currently the determining design factor.”

Note that interconnections between sanitary and storm systems are discussed in UTS (and other) documents: some interconnections (and overflows) are believed to still exist. Also, submerged portions of systems (which constitute a sizable fraction) were not fully evaluated in the UTS.

Please revise DQOs to include impacts of the sanitary and storm systems.

Response: Please see the Navy’s response to DTSC Summary of Major Issues on Draft SAP general comment 14b.

16. Comment: Incomplete list of compounds of potential concern (COPCs)

a. Elimination of COPCs is not appropriate at this time. Compounds measured above risk-based criteria should be retained in the BGMP and should be identified as COPCs. For example, only 5 SVOCs are included, only 7 polynuclear aromatic hydrocarbons (PAHs) are included, and only 3 polychlorinated biphenyls (PCBs) are included, in Table C-1. Common PAHs are not included (e.g., benzo (b) fluoranthene, benzo (k) fluoranthene, indeno (1,2,3-c,d) pyrene, dibenz (a,h) anthracene, etc.). Also, please include organotin, asbestos, and methyl tert-butyl ether (MTBE). Total petroleum hydrocarbon (TPH) criteria approved by the RWQCB should also be included, for TPH quantified as gasoline (TPH-g), as diesel (TPH-d) and motor oil (TPH-mo).

Response: Except where noted in Tables 7A through 7N, groundwater samples collected during the BGMP will be analyzed for the standard target analyte lists. Table C-1 is not intended as a list of all COPCs at HPS. Furthermore, COPCs have not been eliminated via this BGMP. Asbestos and methyl tert-butyl ether (MTBE) have not been identified as COPCs. Criteria for TPH have, however, been added to Table C-1. The Navy has

also revised the SAP to indicate that shoreline wells may be sampled in the future for organotins.

Please see more specific information on organotins at Parcel C in the responses to agency comments in the Phase III groundwater summary report for Parcel C (Tetra Tech 2003d), Appendix M, pages 31 and 53 of the responses to agency comments on the information package for Parcel C. Please see more specific information on asbestos and organotins in the responses to agency comments in the Phase III groundwater summary report for Parcel E (Tetra Tech 2003e), Appendix M, pages 56 and 103. Please see the response to DTSC Summary of Major Issues on Draft SAP general comment 17d for information on organotins at Parcel B. Groundwater samples have been analyzed for MTBE during the GDGI and the RAMP.

- b. Please confirm that all method analytes will be tested for and reported on. That is, a subset of method analytes is not acceptable.**

Except where noted in Tables 7A through 7N, groundwater samples collected during the BGMP will be analyzed for the regular target analyte lists. Table C-1 is not intended as a list of all COPCs at HPS. COPCs have not been eliminated via the BGMP. Asbestos, and MTBE have not been identified as COPCs for current BGMP monitoring. Organotins may be added in the future. Criteria for TPH have, however, been added to Table C-1.

Please see more specific information on organotins at Parcel C in the responses to agency comments in the Phase III groundwater summary report for Parcel C (Tetra Tech 2003d), Appendix M, pages 31 and 53 of the responses to agency comments on the information package for Parcel C. Please see more specific information on asbestos and organotins in the responses to agency comments in the Phase III groundwater summary report for Parcel E (Tetra Tech 2003e), Appendix M, pages 56 and 103. Please see the response to DTSC Summary of Major Issues on Draft SAP general comment 17d for information on organotins at Parcel B. Groundwater samples have been analyzed for MTBE during the GDGI and the RAMP.

- c. Please revise Table C-1 and the new criteria table requested above to include all compounds measured above risk-based criteria (human health and ecological) on Parcels C, D and E in soil or groundwater. Compounds above risk-based criteria on Parcel B should also be included.**

Table C-1 presents reporting limits for the specific chemicals of concern for the BGMP, and POC trigger levels for the RAMP. Please see the responses to DTSC Summary of Major Issues on Draft SAP general comments 6a and 6b.

17. **Comment:** **Analytical Program. General comments and comments on specific analytes are given below. Comments on specific locations are provided under comments for Parcels C, D and E.**

a. General

- i) **Please sample all new wells for the full suite of analytes, since groundwater at the locations of new wells has not been characterized.**

Response: New monitoring wells have been proposed to satisfy specific data gaps in regards to both locations and chemicals. The Navy does not agree that it is necessary, appropriate, or cost effective to sample all new monitoring wells for the "full suite of analytes."

- ii) **Please sample all B aquifer wells for the full suite of analytes since data sets are generally small and/or sanitary and storm system activities may impact the lower aquifers.**

Please see the Navy's response to Summary of Major Issues on Draft SAP general comment 17a(i).

- iii) **Criteria for inclusion of analytes are not explicitly presented. Instead, criteria are embedded in footnotes for Tables 7B et seq. (i.e., footnotes a, b, c and d). DTSC does not agree with some criteria. Especially, DTSC does not agree with the rule that if soil source has not been identified, wells with exceedences are not to be sampled (as discussed above in DQOs). Other rules which are not acceptable include: three samples are considered adequate to determine seasonal variation and metals must be "significantly" (defined as more than 20%) above the HGALs in three samples. Also, TPH plumes commingled with CERCLA plumes should be analyzed for TPH.**

The Navy acknowledges a difference of opinion with the DTSC regarding this comment. It is the Navy's intention not to monitor naturally occurring metals in groundwater.

Sampling for analysis of TPH has been proposed at locations that are both within a plume of VOCs and where concentrations of TPH have exceeded the criteria for the distance from the Bay.

b. 1,4-Dioxane

- i) **Some wells have been selected for 1,4-dioxane analysis, as requested. However, additional wells should be selected for 1,4-dioxane analysis in VOC plume areas (e.g., IR28, IR25, IR10 and IR06) and in areas where painting and stripping operations occurred. It is suggested that wells at source areas (including deeper wells), and wells along the axes of plumes be included.**

One well at each VOC plume monitored during the BGMP was selected for analysis of 1,4-dioxane. The data collected from this effort will be used to determine the extent of further monitoring for 1,4-dioxane.

- ii) Along with 1, 4-dioxane, all other Method 8270 analytes should be requested and reported on.**

Analysis for 1,4-dioxane will likely require a special modification of EPA Method 8270, which will preclude inclusion of other Method 8270 analytes. Wells were selected for analysis of SVOCs in the BGMP only if SVOCs were COPCs for a well.

- c. Cyanide and ammonia. Cyanide and ammonia were "surprise" contaminants on in the landfill area of Parcel E with respect to potential impacts to the bay. Have cyanide and ammonia been fully evaluated with respect to impacts to the Bay over the rest of Hunters Point (including Parcel B)? If not, at a minimum, please add cyanide and ammonia to the analytical program for all wells near the shoreline and for wells in the vicinity of former plating operations.**

Cyanide and ammonia are contaminants typically associated with landfills. Cyanide and ammonia have already been evaluated throughout the base (including Parcel B). Soil, groundwater, and floor scrape samples from Parcel B have been analyzed for cyanide. Cyanide was not identified as a chemical of concern in the Parcel B RI and FS (PRC Environmental Management, Inc. 1996a, 1996b) or the ROD (Navy 1997). Because the fill at IR-07 and IR-18 at Parcel B appears to be construction debris rather than municipal waste, ammonia is not considered a COPC.

- d. Organotin. Organotin should be added to all wells in areas where sandblast grit was used (sub-base and painting areas), stored (e.g., IR06), or disposed (e.g., IR07 disposal pits), as previously requested.**

Minor sandblast waste was removed during the extensive excavations for the remedial action at Parcel B. This source removal should eliminate the potential for the low-solubility organotins to enter the groundwater at detectable concentrations. However, organotins were detected in soil samples collected near the IR-07 and IR-26 shoreline at Parcel B during the shoreline investigation (Tetra Tech 2004). Therefore, the transport of organotins will be evaluated in the TMSRA. The Navy, however, has revised the SAP to indicate that shoreline wells may be sampled in the future for organotins. In the event that shoreline wells are sampled for organotins, then criteria will be considered at that time.

- e. Manganese (Mn). Please clarify that Mn is included in CLP [USEPA's Contract Laboratory Program] metals: if not, please add. No aquatic criteria are presented for Mn. DTSC defers to RWQCB with respect to aquatic criteria for Mn.**

Manganese is a standard target analyte for CLP metals. The Navy is not aware of any aquatic criteria for manganese.

- f. **Mercury (Hg).** Similarly, confirm whether mercury (Hg) is a CLP metal: if not, it should be added as an analyte, especially where aquatic exceedences have been measured.

Mercury is a standard target analyte for CLP metals.

- g. **Radionuclides.** Comments on radiological contaminants will be provided at a later date, pending Department of Health Services's (DHS's) review of the Historical Radiological Assessment (HRA) and other site data.

The Navy will address comments on radionuclides when they are received.

- h. **Total Petroleum Hydrocarbons (TPH).** Review of TPH contamination is deferred to the RWQCB.

The Navy has addressed specific comments on monitoring for TPH. The Navy's general strategy for monitoring for TPH is to sample wells for analysis of TPH at locations that both are within VOC plumes and where concentrations of TPH have exceeded the appropriate criteria based on distance from the Bay. The total TPH criterion for wells located greater than 250 feet from the Bay is 20,000 µg/L and the TPH criterion for wells located closer than 50 feet from the Bay is 1,400 µg/L. The criteria for distances between 50 and 250 feet from the Bay vary between 1,400 and 20,000 µg/L in proportion to the distance.

18. **Comment:** "Emerging chemicals"

- a. **California's Environmental Protection Agency (CalEPA)** requested sampling for "emerging chemicals" at Department of Defense facilities (letter dated June 6, 2003), as noted in DTSC's comments on GDGI (memo dated June 23, 2003). Cal EPA identified this as an urgent need and immediate action was requested. Emerging chemicals include: perchlorate; hexavalent chromium; N-nitrosodiethylamine (NDMA); 1, 4-dioxane; 1, 2, 3-trichloropropane (TCP); and polybrominated diethyl ether (PDBE). Recommendations on analytical methods, reporting limits, etc. were provided with the letter.

Some of emerging chemicals are included in the BGMP sampling (e.g., hexavalent chromium, 1,4-dioxane) but others are not (e.g., PDBE). Please summarize and evaluate existing data (including detection/reporting limits) on emerging chemicals, identify any data gaps, and propose monitoring to address the data gaps. Note that some emerging chemicals might be easily added to the proposed program (see below), and a baseline data set developed.

Response: The comment incorrectly describes the content of the California EPA letter dated June 6, 2003. Neither that letter nor the attached RWQCB draft letter requests sampling for emergent chemicals. The California EPA letter addresses potential perchlorate contamination only and requests that the Department of Defense cooperate with the RWQCB request to report on the potential sources of emergent chemicals, including perchlorate. The RWQCB draft letter (attached to the California EPA letter) requests recipients of the letter to provide an evaluation of the potential sources of the emergent chemicals. The RWQCB letter states "Following review of the source evaluation report there will be a determination made by Board and /or DTSC staff if a proposal for collecting emergent chemical data for soil, surface water and groundwater is necessary." The Navy responded to RWQCB in December 2003 with a preliminary source evaluation report. The Navy, therefore, has complied with the California EPA and RWQCB requests regarding emergent chemicals. The Navy has not received a determination from RWQCB or DTSC based on the preliminary source evaluation report. Nevertheless, the Navy has proposed sampling in the BGMP for some emergent chemicals at certain locations. The rationale for the chemicals selected and their sampling locations is provided in the SAP.

- b. Very high concentrations of PBDE in Bay Area human and animal populations have been reported. At the minimum, landfill and shoreline wells should be analyzed for PBDE. Note that PDBE can be measured with Method 8270. Please include a request for PBDE with all Method 8270 analysis.**

Response: The Navy may consider the request in the future, if polybrominated diphenyl ether (PBDE) is determined to be a CERCLA hazardous constituent and if risk factors and ecological criteria are established for evaluating PBDE data.

- c. NDMA can also be measured with SVOC methods (but please confirm that the required reporting limit of.002 ug/L can be met). Please request analysis for NDMA.**

Please note that N-nitrosodimethylamine is usually associated with rocket fuel, which has not been present at HPS. In addition, no ecological criteria for N-nitrosodimethylamine exist at this time.

- d. TCP can be measured with VOC methods (but please confirm that the required reporting limit of.005 ug/L can be met). Please request analysis for TCP.**

As noted in Section 1.2.2, 1,2,3-trichloropropane (TCP) will be added to the standard target analyte list for EPA Method 8260. The reporting limit for 1,2,3-TCP in water by the standard method is typically 10 µg/L. The reporting limit for TCP in water by the low-level modification of this method is typically 1 µg/L. The reporting limit for 1,2,3-trichloropropane

by EPA Method 524.2 is typically 0.5 µg/L. The required reporting limit of 0.005 ug/L cannot be achieved by routine analytical methods at this time.

19. Comment: Methane

- a. Methane has been measured at other site locations in addition to the landfill (IR1/21) during groundwater sampling (e.g., IR12MW17A) and in early investigations (Solid Waste Air Quality Assessment Test, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California (SWAT) dated August 4, 1989, and Reconnaissance Activities Report/Feasibility Studies, Naval Station Treasure Island, Hunters Point Annex, San Francisco, California (RAR) dated August 9, 1990: both by Harding Lawson Associates, Inc.) Although IR1/21 has been investigated, IR12 and other sites have not been fully investigated with respect to methane. High values in ambient air were reported at some locations: but very few samples were collected. For example, SWAT ambient air results include: 1.1% (IG-04 in IR12), 2% (IG-03 in IR1/21), 46% (IG-05 in IR02 NW), 5% (IG-06 in IR02C), 56% (IG-7 in IR03), 83% (IG-9 in IR02 Southeast), 59% (IG-10 in IR11/14/15), .5% (IG-17, location not shown on Plate 2).

Response: The Navy acknowledges this comment. The site health and safety plan requires the use of an oxygen meter and an explosimeter during sampling procedures at the landfill and former oil reclamation ponds. The Navy will review adjacent site data to determine if the same procedures should be implemented in areas surrounding the landfill and former oil reclamation ponds.

- b. Instructions to field crews regarding methane (Section 8.3.3.1) should be expanded to include other areas of the site.

The Navy acknowledges this comment. Oxygen and organic vapor readings are taken during sampling procedures at the landfill and oil reclamation ponds.

- c. In addition to concerns about the safety of site workers, these data suggest that additional soil gas investigations might be prudent in areas in or adjacent to residential reuse zones, in capped areas (e.g., IR03), and in disposal areas.

The scope of the BGMP does not include an investigation of soil gas.

20. Comment: Well repair

- a. Unacceptable well conditions have been commonly noted at the site. Well conditions improved with the site-wide well inspection program in 2002. But some problems identified in 2002 have not yet been addressed. All ground penetrations are potential physical

hazards and potential conduits for groundwater, surface water, or gas. Moreover, unacceptable well conditions may result in substandard or indefensible data. The text notes that well inspection and repair will precede sampling: these actions will help to ensure better data quality.

Please include well inspection forms and corrective action forms in the report pursuant to the BGMP.

Response: Wells that are either indicated in Table F-1 or that were discovered during quarterly inspections, and that are included in the sampling plan, will be repaired during the quarterly monitoring events. A summary of repairs completed at wells during the quarterly monitoring will be included in subsequent reports. Deficiencies will be recorded on the well monitoring forms.

b. Please confirm that wells for groundwater level measurement will also be inspected and repaired as needed prior to taking water levels.

Please see the Navy's response to DTSC Summary of Major Issues on draft SAP general comment 20a.

c. Data from wells should be flagged if well conditions were substandard at the time of data collection.

Conditions of monitoring wells will be inspected during each sampling event, and deficiencies in the conditions of wells will be noted on well condition survey forms. Quarterly sampling sheets will be included with the quarterly reports. The Navy does not have a protocol to "flag" data based on "sub-standard" well conditions. Data from each well will be evaluated and one set of the evaluation criteria will be evaluated and the information recorded on the well monitoring forms.

21. Comment: Shoreline monitoring wells

a. Well construction details of "shoreline" wells should be reviewed for appropriateness with respect to monitoring for protection of the San Francisco Bay. Because wells have been installed for a variety of purposes and have varying construction details, existing wells along the bay margin may not all be appropriate. For example, shallow wells should be screened across the water table to monitor for LAPL: however, some wells at the shoreline are not screened across the water table, or their construction details are not known (e.g., IR03MW220 A, 225A, and 370A).

Response: The Navy has evaluated the construction details and has concluded that the shoreline wells included in the BGMP are adequate for monitoring purposes. This information will be included in the final SAP. Missing

screen depth information for wells IR03MW225A and IR03MW370A have been added to Table F-1. Monitoring well IR03MW220A does not exist.

- b. **The Navy should propose appropriate criteria (e.g., screen lengths, screened intervals, screen materials) for shoreline wells. Please expand DQOs accordingly. For example, at IR02SE, screen lengths vary from 5 feet (IR02MW206A1) to 22 feet (IR02MW175A). Screened intervals vary from 2.5 to 7.5 feet below ground surface (fbgs) (IR02MW206A1) to 9.0 to 31 fbgs (IR02MW175A: which does not intersect the water table). Needless to say, data from these two wells would not be comparable with respect to bay protection.**

“Shoreline wells” describes monitoring wells the Navy selected for monitoring nearest to the Bay shore. The term and the group of wells selected for monitoring do not require DQOs, as the requirement is to allow monitoring of the groundwater. The Navy has evaluated the construction details and has concluded that the shoreline wells that will be sampled are adequate for monitoring along the shoreline.

Five new shoreline wells were installed at Parcel B to match the construction of the decommissioned wells that they replaced. Additional shoreline wells are not proposed at this time.

- c. **Several shoreline wells have stainless steel (SS) well screens. These include IR02MWB-1 to B-4 and IR03MW0-1 to 0-3 (Table F-2). Since nickel (Ni) can leach from SS (especially in corrosive environments), SS wells should be evaluated for the potential to cause Ni contamination along the shoreline.**

At this time, the Navy does not plan to evaluate the potential for nickel leaching from stainless steel well screens.

22. **Comment:** TS wells

- a. **Well construction details are not provided for all TS wells: please provide such information in Table F-2.**

Response: Table F-2 has been revised to include treatability study well construction details.

- b. **SS wells were recently installed at some TS locations (e.g., Ferox injection wells IR28IMW938F to 940F). SS wells should be evaluated with respect to Ni leaching.**

Please see the Navy’s response to DTSC Summary of Major Issues on Draft SAP general comment 21c.

23. Comment: Stabilization criteria

- a. DTSC repeats the observation that failure to meet stabilization criteria may indicate a lack of confidence in results. For example, when dissolved oxygen concentrations exceed saturation, results for volatile organic compounds (VOCs) will be low-biased. Every effort should be made to ensure that high quality data is collected.**

Please discuss wells that fail to meet stabilization criteria in the report pursuant to the BGMP, and evaluate resulting data uncertainties (e.g., VOCs, monitored natural attenuation (MNA) parameters, metals).

Failure to meet stabilization criteria will be noted on the field sampling forms, as appropriate. Field sampling forms will be included with each quarterly monitoring report.

- b. Failure to meet stabilization criteria was attributed to equipment breakdown in some cases. To ensure that high quality field readings are taken (while maintaining the field schedule), back-up instruments should be provided for the field crew. The field crew should immediately assess whether field readings are reasonable and correct errors by taking additional readings or using backup equipment.**

All sampling equipment will be evaluated daily and replaced if necessary during sampling operations. Backup water quality meters will be available to the field crews in the event of equipment malfunction.

- c. Samples that do not meet stabilization criteria should be flagged.**

The Navy does not intend to flag analytical data for groundwater solely based on water quality measurements made in the field during sampling. Verification of field data is discussed in Section 10.1.1 of the SAP. Data values that are significantly different from the norm will be qualified as an outlier.

24. Comment: Items postponed to the BGMP or Feasibility Study (FS). Multiple issues raised in previous reviews were deferred to the BGMP (or the FS) in the Navy's response to comments (R2Cs) for various documents. To facilitate review of the BGMP, the Navy should provide a table, citing specific R2Cs and the resolution proposed in the BGMP or deferred to the FS.

Response: The Navy does not agree that a table is necessary to document issues deferred to either the BGMP or the FS. The Navy will make every effort to incorporate the deferred issue into the appropriate document at the appropriate time.

RESPONSES TO COMMENTS FROM DTSC ON PARCELS C, D, AND E

General Comments

Recommendations and requests for additional work generally fall into several categories, summarized below.

1. **Comment:** **Monitoring of additional wells inside plumes recognized by the Navy is requested (e.g., close to sources, at depths, at edges, and along axes);**

Response: Groundwater monitoring networks have been proposed for each of the plumes based on the aerial and vertical extent of contamination and groundwater flow patterns identified. The sampling network contains a sufficient number of wells to monitor changes in plume size and position and changes in concentrations at source areas.

2. **Comment:** **More analytes for plumes recognized by the Navy are requested (especially, for plumes which the Navy has characterized as single-analyte plumes, but for which other contaminants are common or extensive);**

Response: Please see the Navy's response to DTSC Parcel C, D, and E general comment 1, above. The Navy is sampling for analysis of COPCs where appropriate based on the criteria presented in the SAP.

3. **Comment:** **Sampling of plumes not recognized by the Navy is requested (these are mostly metals plumes such as nickel at IR09--but also includes VOC plumes, e.g., at IR12 and IR30);**

Response: The Navy is sampling for metals analyses where a potential industrial source is present. At IR-12 the Navy is sampling for VOCs at wells IR12MW14A and IR12MW17A. Additional wells at IR-12 may be sampled in the future as indicated in Table H-11. Although there are no selected wells for sampling for VOCs at IR-30, the following wells may be sampled in the future for VOCs as indicated in Table H-5: IR30MW01F, IR30MW02F, and IR30MW04F.

4. **Comment:** **Additional monitoring of the deeper A-aquifer and the B-aquifer is requested (e.g., monitoring of paired wells and triplets, monitoring downdip of bedrock highs).**

Response: The Navy is installing new wells in areas where shallow A-aquifer contaminants have the potential to migrate to deeper A-aquifer and B-

aquifer zones. Two new wells will be installed at RU-C1 to monitor groundwater in the B-aquifer (IR28MW171B and IR28MW353B); one new well will be installed at RU-C2 to monitor groundwater in the B-aquifer (IR28MW221B); one new well will be installed at RU-C4 to monitor groundwater in the B-aquifer (IR28MW315B); and two new wells will be installed at RU-C5 to monitor groundwater in the deeper A-aquifer zone (IR25MW60A2 and IR25MW61A2).

5. **Comment:** Additional monitoring is requested in areas where flow directions may change as a result of anticipated or presumed changes to the sanitary system pumping regime and to anomalous mounds and sinks.

Response: The Navy does not intend to anticipate or presume where the direction of groundwater flow may or may not be affected by future alterations to utility systems. Quarterly monitoring of the proposed groundwater elevation network will provide adequate data to recognize potential changes in patterns of groundwater flow. In the event that changes in the pattern of groundwater flow are recognized and considered a result of alterations to the utility system, then the Navy will evaluate the need to modify the groundwater elevation network.

6. **Comment:** Additional sampling for ecologically-sensitive compounds along the Bay margin is recommended.

Response: The Navy's strategy along the shoreline is to sample for metals at strategic locations and for organic compounds at locations downgradient of plumes.

Specific Comments on Parcel C

1. **Comment:** Remedial Unit C-1 (RU-C1) (BGMP Figure 5 and Table 7B)
- a. Proposed sampling wells are located at the center and at the edges of plumes. With respect to inhalation risks in the human health risk assessment (HHRA), sampling of additional A-aquifer wells interior to the plume is necessary so that concentration contours can be more accurately drawn. All VOC plume areas (RU-C1 and elsewhere) should be evaluated with respect to the adequacy of the data set for risk assessment.

Response: The Navy's strategy is to track plume migration by monitoring the edges of the plumes. The Navy believes that sampling within the plume will not improve the human health risk assessment (HHRA) with respect to indoor air inhalation. It is anticipated that the VOC plume area of concern will include the delineated plume and a buffer zone.

- b. Three A-aquifer wells closer to and around the source areas at Buildings 231 and 253 should be included for VOC sampling, to track any changes to higher concentration contours. Wells with increases in recent (post-TS) sampling and wells with higher concentrations are preferred.**

The Navy acknowledges this comment. Wells in and around treatability study areas will continue to be monitored in present and future treatability studies. To avoid redundancy of sampling efforts, sampling of such wells is not specified in the SAP.

- c. Proposed well locations IR28MW171B and 353B are acceptable. However, well screens should be installed just above the bedrock interface to check whether DNAPL has migrated along the bedrock surface: Table F-2 says "below Bay Mud"—which is not specific enough. If wells are screened as requested, three wells will be located within the bedrock channel (the dominant subsurface feature, as shown on P3GDGI Figure 3-3), and it will be possible to evaluate whether DNAPL has migrated along the channel.**

Historical analytical data for dissolved concentrations of DNAPL-forming compounds do not indicate that DNAPL is likely to be present at RU-C1. New monitoring wells, therefore, will not be installed for monitoring DNAPL. The rationale in Table F-2 for new wells IR28MW353B and IR28MW171B has been modified to state that the well screen should be installed in a permeable interval below the Bay Mud for monitoring of the B-aquifer.

- d. Removed well IR28MW149A (paired well to IR28MW309B) should be replaced and included in VOC sampling and groundwater level measurement programs.**

Well IR28MW309B is included in the sampling program. Monitoring well IR28MW169A is included as part of the monitoring program and will provide sufficient data to track migration of the plume in the western part of RU-C1. Monitoring wells IR28MW309B and IR28MW149A are included in the groundwater level measurement program.

- e. New wells and B-aquifer wells should be sampled for all metals (including CrVI, Hg, Mn) and 1, 4-dioxane (semi-volatile organic compounds (SVOCs)) for a minimum of one quarter.**

The two new wells proposed for RU-C1 (IR28MW191B and IR28MW353B) are completed in the B-aquifer and have been chosen to provide additional monitoring for VOCs and SVOCs. Metals were detected in samples collected at RU-C1 above screening criteria, but mostly in the area near the Building 253 sumps. The proposed new wells are not in this area, and there are no B-aquifer wells in this area. Analysis for metals, therefore, will not be added for the new wells or B-aquifer

wells. The Navy's strategy for monitoring for 1,4-dioxane is to select locations for sampling that are in or near source areas. The Navy has chosen two existing wells at RU-C1 for analysis of 1,4-dioxane. The new wells are not near source areas and are not selected for analysis of 1,4-dioxane at this time.

- f. **Metals.** Very few analyses for metals are proposed, despite the fact that high concentrations have been measured, especially near the former sumps in Building 253 (e.g., thallium at 1900 ug/L on P3GDGI Figure 4-12). At the minimum, IR28MW902A and 930A should be retained and sampled for the full suite of analytes. In addition, IR28MW353A (downgradient of 902A) should be sampled for metals (including CrVI). And, IR28MW136A, which is located in the center of the TS area and which is the only A-aquifer well in the area proposed for sampling, should be sampled for metals (including CrVI). IR28MW353A should be sampled for CrVI.

Existing data characterize the source area at Building 253 as containing elevated concentrations of metals and are adequate for the FS.

- g. **Bay protection.** Ecological criteria have been exceeded in wells near or adjacent to the shoreline (e.g., metals on P3GDGI Figure 4-12). Continued monitoring of shoreline wells for ecologically sensitive analytes would be prudent since a more robust data set would facilitate FS decision-making. Other examples: cyanide was measured at 2 ug/L in PA50MW03A. For two other sampling events, the detection limit was elevated at 10 ug/L, which is above the aquatic criteria of .75 ug/L. Detection limits (DLs) for Aroclor-1260 were elevated (up to 0.1 ug/L) above the BGMP aquatic evaluation criteria of .03 ug/L. Please clarify whether DLs were elevated for other shoreline wells for ecologically sensitive analytes.

Well PA50MW03A has been selected for sampling, as indicated in Table 7F and on Figure 9 in the draft BGMP, and cyanide has been selected as an analyte. In the final BGMP, this well has been moved from Table 7F (the nonplume table) to Table 7B (the RU-C1 table), and its selection has been moved from Figure 9 to Figure 5. As indicated in Table 7B, PCBs are proposed for analysis at one of the two RU-C1 wells where PCBs have been detected: IR28MW171A. The other well where PCBs have been detected contains LNAPL and has not been selected for additional sampling at this time. The Navy has selected the wells based on past results and believes that the selection is adequate to support the FS. As specified in the Phase III GDGI summary reports and the draft SAP, project-required reporting limits are those of current, routinely used analytical methods, unless reasonable grounds are established for pursuing nonroutine methods. The reporting limits that exceed screening criteria are noted in the GDGI and in Table C-1 of the draft SAP. As specified in

Section 3.2 of the draft SAP, reporting limits exceeding the standard reporting limits for the analytical methods were considered in the BGMP design during the evaluation of the groundwater data for each well.

- h. Multiple errors with respect to aquifer designation are shown on BGMP Figure 5 and Table 7B (when compared with cross sections from P3GDGI Figure 4.2). These are: 173B should be B aquifer (not A/B), 255F should be F (not A/B), 400B should be A (not A/B), and 401B should be B (not A). This figure should be corrected and resubmitted. Other wells and other figures should be checked for accuracy.**

Figure 5 and Table 7B have been corrected as identified in the comment, except that well IR28MW255F is designated as a B-aquifer well because it is screened in bedrock considered part of the B -aquifer.

- i. IR28MW269A is shown as decommissioned on Figure 5 but as “added to BWMP” on Figure G-1: please clarify the condition of this well.**

Monitoring well IR28MW269A was decommissioned during the Parcel C TCRA on April 18, 2002. Figure G-1 has been corrected to show the well as decommissioned.

2. Comment: RU-C2 (BGMP Figure 6 and Table 7C)

- a. Proposed well locations IR28MW221A and 221B are acceptable.**

Response: The Navy acknowledges this comment.

- b. The bottom of the well screen for 221B should be located just above the upper surface of the clay in order to determine if DNAPLs exist. The Rationale and Comments column says: “Bottom of screen should be above expected clay”, which is correct. But the wrong depth (35 – 45 fbgs) is given in the Estimated Screened Interval column. Please correct the well screen depth in Table F-2 to “45 to 55” fbgs to be consistent with cross section J-J’ of the P3GDGI which shows the top of the clay at about 57 fbgs.**

Table F-2 has been revised to reflect the correct screen depth of 45 to 55 feet below ground surface (bgs).

- c. Please add the following wells and analytes:**

- i) In the sump/dip tank area, the vertical gradient is down and increases in some contaminants have been observed in deeper zones. Please include existing deeper wells in the sump/dip tank area in Building 251 to monitor for increases of VOCs in deeper wells. Please include: IR58MW35A (for increasing cis-1,2-dichloroethene (DCE)), IR58MW33B (for increasing vinyl**

chloride (VC) and increasing cis-1,2-DCE--combined with decreasing VOCs in paired shallower well 33A). Add IR58MW31F, a deeper well in sump/dip tank area, for VOC monitoring. Analyze for the full suite in these paired wells (e.g., 35A, 33B, 31F) in the source area: VOCs, SVOCs (with 1,4-dioxane), pesticides/PCBs (PCB exceedences shown on FS Figure ES-3), metals (including CrVI) and cyanide. Similarly, sample IR58MW31A (central well) for the full suite of analytes.

Based on Figure 3-8 of the Phase III GDGI report for Parcel C (Tetra Tech 2003d), the vertical hydraulic gradient at RU-C2 is upward, not downward as stated in the comment.

On further examination, the Navy will sample the following well triplet in the source area: IR58MW31A, IR58MW33B, and IR58MW31F. The Navy believes these wells are the best choice for monitoring the source area because their screens cover three discrete elevation intervals that do not overlap. Wells IR58MW33B and IR58MW31F have been added to Table 7-C, and samples from these wells will be analyzed for VOCs only; these wells have been removed from Table H-2. Additionally, well IR58MW34A has been removed from Table 7-C and has been added to Table H-2. Figure 6 has been modified accordingly.

- ii) **Except for the central well, all other proposed wells are outside the plume boundaries for VOCs (e.g. outside the plume boundaries of cis-1, 2-DCE and VC as shown on BGMP Figures 5-6 and 5-7). More wells closer to the source (and TS area) should be added for VOC monitoring.**

The Navy believes that the existing wells selected and new wells proposed are adequate for monitoring the plume at RU-C2.

- iii) **Add barium to IR28MW216F.**

Samples from well IR28MW216F have been analyzed seven times for barium since 1994; the most recent was in 2000. Barium has been detected at a concentration above the HGAL twice, and only in 1995. No other metals have been detected above HGALs in samples from this well. The Navy does not believe that this well warrants additional sampling for analysis of barium.

- iv) **New wells should be sampled for full suite of analytes.**

Please see the Navy's response to DTSC Summary of Major Issues on Draft SAP general comment 17a (i).

3. **Comment:** RU-C4 (BGMP Figure 7 and Table 7C)

- a. **Proposed well locations IR28MW272F, 315A, 315B, and 315F are acceptable.**

Response: The Navy acknowledges this comment.

- b. Include multi-level wells IR28MW933F1 to F5 and 934F1 to F5 for VOC analysis.**

Wells IR28MW933F1-F5 and IR28MW934F1-F5, indicated in Table H-3, are considered redundant monitoring locations for the VOC plume. Several A-aquifer, one bedrock WBZ, and A-/B-aquifer wells are proposed for VOC sampling within the plume at RU-C4.

- c. All wells proposed (except for 211F) are located outside the 200 ug/L contours for TCE (P3GDGI Figure 6-5). Please include wells closer to and around the source areas, including more wells to the south in the direction of plume migration, so that: high concentrations will be tracked and data appropriate for risk assessment and the FS will be collected. IR28MW403, 404 and 405 are suggested.**

The Navy has proposed to sample six wells within approximately 100 feet of well IR28MW211F, where historically the highest concentrations of VOCs have been detected at RU-C4. Sampling of other A-aquifer wells within the 200 ug/L contour line in the Phase III GDGI would be redundant, as is indicated in Table H-3. The monitoring well closest to the source, IR28MW211F, will be sampled, six surrounding wells within 100 feet of well IR28MW211F will be sampled, and several wells located downgradient of well IR28MW211F and the source area will also be sampled. The Navy does not agree about the need for additional monitoring locations at RU-C4. The Navy's strategy is to track plume migration by monitoring the edges of the plumes. The Navy believes that sampling within the plume will not improve the HHRA with respect to indoor air inhalation. It is anticipated that the VOC plume area of concern will include the delineated plume and a buffer zone.

- d. Add SVOCs (with 1, 4-dioxane) to wells in the center of the plume (including deeper wells) and along the plume axis.**

Well IR28MW312F has already been proposed as a sampling location for analysis of 1,4-dioxane. Deeper wells may be sampled in the future if a 1,4-dioxane problem is documented in shallow groundwater.

- e. Please add 1, 4-dioxane and metals (including Hg and CrVI) to IR28MW211F.**

The maximum concentration of total chromium at well IR28MW211F was 2.2 ug/L and there were five non-detect results for chromium. Mercury has never been detected in samples collected at well IR28MW211F, and Table 7D has been revised so that it no longer states that mercury has been detected in samples collected at this well.

- f. Several exceedences of Hg have been noted (Appendix H): additional sampling for Hg would be prudent.**

Table H-3 indicates that well IR28MW933F2 may be sampled in the future for analysis of mercury.

g. Add IR28MW310F for VOCs and metals (including CrVI).

The Navy has already proposed sampling for analysis of VOCs at existing bedrock WBZ monitoring well IR28MW350F, located upgradient of well IR28MW310F, and at the proposed bedrock WBZ monitoring well, IR28MW315F, whose proposed location is downgradient of well IR28MW310F. Table H-3 indicates that well IR28MW310F may be sampled in the future for analysis of hexavalent chromium.

h. Future sampling is implied for some wells with metals, PCBs and pesticide exceedences (Appendix H). It is recommended that such sampling be included in the BGMP so that a more robust data set is available for FS decision-making.

The Navy has proposed a sampling plan that will provide data adequate for the evaluation in the FS. Appendix H indicates potential future sampling for some wells and analytes to recognize a potential need for future modifications to the BGMP.

4. Comment: IR25 (RU-C5)

a. Comments on IR06 which included in Comments on Parcel B (previously provided) are not repeated here. Comments on IR25 are included here.

Response: The Navy acknowledges this comment.

b. In the BGMP, IR06 is shown as located in Parcel C. However, IR06 is within the boundaries of Parcel B in the Parcel B ROD. Also, in the BGMP, the Parcel B boundary adjacent to IR25 has been shifted about 50 feet to the west and about 25 feet to the south into Parcel C from the boundary locations in the Parcel B ROD. Please revise the BGMP to be consistent with the ROD.

The boundary between Parcels B and C was revised as explained in a Navy memorandum dated February 1, 2002, from Richard G. Mach, Jr. to the HPS administrative record file. This memorandum was transmitted to the BCT on February 19, 2002 (Navy 2002). The Parcel B ROD predefines the boundary adjustment, so no changes were made to the Parcel B RAMP. No changes to the BGMP figures are necessary.

c. Cross sections (Figures 7-2 and 7-6 to 7-12)

i) The aquifer (in Qu) beneath the Bay Mud should be shown as the B aquifer (not the A aquifer). The stratigraphic location of the B aquifer (i.e., in the Qu, below the Bay Mud) should be consistent throughout the document: please revise the document accordingly.

The comment refers to figures from the final Parcel C Phase III GDGI report dated September 2, 2003. The regulatory agencies, including DTSC, reviewed a draft version of this report, and the Navy addressed comments. The figures in the final report are essentially the same as in the draft. The Navy believes that the stratigraphic and hydrostratigraphic interpretations presented in those figures are valid. No new information has become available since the final report was issued to warrant a change in the interpretation. These interpretations will therefore not be changed based on this comment.

- ii) Well nomenclature should correspond to stratigraphy, not to hydraulic connectedness. New wells located in Qu should be designated as B wells. Similarly, wells in bedrock should be consistently named as "F" wells, even when hydraulically connected to A-aquifer. To eliminate this confusion, the Navy should consider re-naming site wells to be consistent with stratigraphy.**

Historically, well names have ended in A, B, or F, depending on the hydrostratigraphic interpretation (A-aquifer, B-aquifer, or bedrock) of the field hydrogeologist responsible for installing the well. With the accumulation of data, the hydrostratigraphic interpretation for some wells has changed. The Navy, however, believes that changing a well name is a poor data management strategy because many documents exist that use the original names. Well names, therefore, will not be changed. The Navy disagrees that well nomenclature should follow stratigraphy and not hydrostratigraphy and will continue to name wells according to hydrostratigraphic interpretation at the time the well is installed. Current hydrostratigraphic designations of wells are maintained in the HPS database and are provided in tables or lists in the Phase III GDGI reports. Furthermore, well names should not be relied on for the Navy's current hydrostratigraphic interpretation. The Navy has provided tables or lists in the Phase III GDGI reports that identify the hydrostratigraphic zone of each well according to current interpretation. The Navy will continue to provide these tables and lists in annual groundwater monitoring reports.

- iii) Well designations and aquifer designations are not consistent. Inconsistent well and aquifer designations have been assigned by various investigators through time. So, it is difficult to review this area: stratigraphy for each well has to be individually reviewed. Most "B" wells are not truly B wells since they are not screened in Qu below the Bay Mud: e.g., 905B is screened right beneath the water table (in Qaf). RWQCB has agreed that drinking water is not a beneficial use for the A-aquifer at Hunters Point: no such determination has been made for the B aquifer.**

Please see the response to DTSC Parcel C comment 4c (ii). The well name should not be relied on for the current hydrostratigraphic interpretation. The cross sections in the Phase III GDGI reports have been prepared to depict the current hydrostratigraphic interpretation.

- iv) There appear to be two low-permeability surfaces along which DNAPL may migrate: the upper surface of the Bay Mud (Qbm) and the upper surface of the bedrock (Kf). Some wells are screened along the Bay Mud surface but the upper surface of the bedrock is not adequately characterized. If three new wells proposed are screened above the bedrock surface, as discussed below, this data gap will start to close.**

A treatability study being conducted at RU-C5 will address potential DNAPL contamination. New wells have been installed for the treatability study including wells that are expected to assist in evaluating the potential for DNAPL to migrate along the bedrock surface at RU-C5.

- v) Bay Mud (Qbm) is continuous over most of the area, but it is very thin (about 5 feet) so its competency as an aquitard is questionable. Low-permeability lithologies are also noted in Qaf and Qu, generally to the east, which may retard contaminant migration to the east, in the direction of Parcel C.**

The first bullet of the Parcel C Phase III GDGI report's Section 7.2.2 indicates that there is not a continuous aquitard at IR-25. The assertion that there is not a continuous aquitard at RU-C5 comes from the cross-sections in the GDGI's Figure 7-2. The Bay Mud unit does extend across the RU-C5 site but includes laterally continuous portions that are coarse grained and so do not locally act as an aquitard. There is a vertical hydraulic connection between the upper and lower sections of the A-aquifer as between the A-aquifer and the bedrock water-bearing zone. The limited thickness and lithology of the Bay Mud in this area indicate that it does not act as an aquitard that separates the two aquifer zones. The Bay Mud in this area is mostly silty or clayey sand similar to the materials above and below it. The Navy believes that the B-aquifer is absent at RU-C5 and that the aquifer zone previously called the B-aquifer should be called the lower A-aquifer zone.

- vi) IR25MW15A2 is screened from the upper surface of the Bay Mud to the bedrock surface. As such, it may serve as a conduit between two DNAPL migration pathways. Please evaluate whether this well should be removed.**

Well IR25MW15A2 has been decommissioned. The well will be replaced by new wells planned to be installed as part of the sequential anaerobic/aerobic bioremediation treatability study.

- d. In these comments, DTSC has not reviewed and approved decommissioning proposals. "Planned decommissioned wells" are shown on RU-C5 figures: some of these wells have highest concentrations measured on the site for various compounds and are essential as center-of-the-plume monitoring wells. In fact, continued monitoring of some "planned decommissioned" wells is requested in these comments (and by other reviewers). If, however, the wells have already been destroyed (e.g., in TS areas), then replacement wells at similar locations and depths should be selected for sampling.

Also, insufficient rationale has been provided for decommissioning (which should be proposed in a separate workplan).

A total of 14 wells in RU-C5 have been recently decommissioned and seven new wells were installed. Plans for well decommissioning were discussed with the agencies during the March 2004 BCT meeting.

- e. Locations of proposed new wells IR2560A1, 60A2, 61A1, 62A2 and 62F are acceptable. However, well construction details (Table F-2) are not consistent with cross sections (Figure 7-2) and aquifer designations are not consistent.

- i) IR25MW60A1 and 61A: the top of the well screens should be above high water table (not at 10 and 15 fbgs, as shown).

The monitoring well constructions of IR25MW60A1 and A2 were designated to intercept the most mobile of the plume at IR-25 in the upper A-aquifer by positioning the well screen in the most permeable 10-foot interval between the water table and a depth of 20 feet (Table F-2). Because the plume at this location in IR-25 is anticipated to consist primarily of dissolved chlorinated solvents, straddling the water table with the well screen is not considered necessary.

- ii) IR25MW60A2 and 61A2: these wells should be designated as B wells (not A2) since they are installed in Qu, beneath the Bay Mud.

Please see the response to DTSC Parcel C comment 4c (ii), (iii), and (v).

- iii) IR25MW61A2: bottom of screen should be at least at 45 fbgs (not 40 fbgs), the depth of the bedrock contact. Why is a five foot screen proposed for this well?

The bottom of the well screen was erroneously specified as 40 feet bgs in Table F-2 and has been changed to 45 feet bgs in the final BGMP. The proposed screen length for monitoring well IR25MW61A2 is 10 feet.

- iv) IR25MW62F: If the bottom of the well is "above the first low-permeability bedrock zone", then this should be classified as a B well (not an F well). A new F well at this location may be duplicative with IR25MW15F (a true F well). However, more F wells may be required since IR25MW15F is the only F well in the area.

The Navy has decided not to install IR25MW62F because installation of a well at that location conflicts with treatability study plans for RU-C5. IR25MW62F would have been centered in the former source area, which is the subject of the treatability study. Several new wells have been installed in the RU-C5 area to support the treatability study and these wells are expected to provide the data that IR25MW62F was expected to provide. IR25MW62F has been deleted from Table 7-E and removed from Figures 8A and 8B.

- f. Sampling inside the plume.** With the exception of the new proposed bedrock well IR25MW62F, no wells are proposed for sampling inside the Building 134 plume, which is not acceptable. Additional wells are requested in the source/TS area and at depth. Please include: 19A, 15A1, 15A2, and 902B in the central area: these wells are close together, have high concentrations, and are screened at various depths. Include IR25MW18A to monitor the A-aquifer directly downgradient of the source area. Include IR25MW11A.

New wells for the treatability study have been installed and will be sampled within the plume. Sampling and analysis of these wells are not included in this BGMP to prevent redundancy of sampling between the two sampling efforts. Figures 8A and 8B show the locations of new proposed treatability study wells as small yellow stars.

- g. Paired wells should be included, especially paired wells that monitor the edge of the plume.** Also, since the soon-to-be-revised Parcel B ROD amendment must consider all plumes underlying Parcel B, the distribution of contaminants in boundary areas should be closely monitored: so, paired wells near the Parcel B/C boundary should be included. Please include paired wells: IR25MW37A and 37B, IR25MW39A and 39B, and IR06MW44A and IR25MW42B.

VOCs have either not been detected in the past at these well locations or have been detected at low concentrations (less than the MCL). The Navy believes that the existing data from these wells are sufficient to define the boundaries of the plume for the FS.

- h. All RU-C5 wells should be analyzed for the full suite of analytes, since high exceedences of multiple compounds have been measured (P3GDGI Figures 7-3 to 7-20).** Please analyze for: VOCs, SVOCs (with 1, 4-dioxane), pesticides/PCBs, metals (including CrVI), TPH, and cyanide.

The primary purpose of the BGMP is to monitor groundwater conditions that have been characterized previously. The analytes proposed in the BGMP for monitoring wells at RU-C5 were based on stable contaminant concentrations established during previous sampling rounds. The contaminants of concern are VOCs and SVOCs; samples from wells

selected at RU-C5 will be analyzed for these two contaminant classes. Groundwater will be analyzed for pesticides/PCBs from wells where these contaminants have been found to be elevated in previous sampling rounds.

- i. **Proposed new wells.** It is not clear why multiple new wells are proposed inside the Building 134 source area, but the new wells are not selected for monitoring (these are shown as small yellow stars on Figure 8A). Also, such wells are not shown in Table F-2: Construction Information for New Wells. Is Figure 8A in error? Are these TS wells? Please clarify.

In the draft BGMP, the small yellow stars represent proposed new wells for the treatability study. The treatability study wells have been installed and 14 wells were decommissioned. Figures 8A and 8B have been revised to show the new treatability study wells and the decommissioned wells. To avoid duplication of sampling, treatability study wells are not selected for monitoring in the BGMP because they will be sampled as part of the treatability study.

- j. **Two groundwater flow direction arrows are included for Building 134.** The direction of contaminant migration as indicated by the shape of the plume trends to the northeast (onto Parcel B) which is consistent with one arrow (BGMP Figure 8A). However, the shapes of the VOC plumes do not agree with the other arrow which shows flow to the southeast (onto Parcel C) along the groundwater trough (i.e., parallel to Lockwood Street) (BGMP Figure 4). This shape may indicate that flow is predominantly towards the northeast (onto Parcel B).

The arrows that indicate the direction of groundwater flow shown on Figure 8A indicate a groundwater divide that approximately coincides with the southwestern edge of the potential source area at RU-C5. Thus, flow from the source area is predominantly to the northeast. However, the divide appears to have split contaminant transport, with a small amount moving to the southeast, as is indicated by the shape and size of the plume. This flow pattern is believed to be attributable to a ruptured sanitary sewer line below the water table.

5. **Comment:** "Non-Plume" wells

DTSC and the Navy disagree regarding the definition of "plume" (as noted in previous comments) and regarding the selection criteria for the analytical program (general comment 16, above). Since DTSC's criteria are more stringent than the Navy's, additional wells and analytes are requested for "non-plume" areas (on Parcel C and elsewhere).

Response: The Navy addresses specific comments throughout the responses regarding particular monitoring locations and analytes.

b. Please add the following wells and analytes.

- i) Monitoring VOCs at IR29MW85F has been proposed. This action is appropriate since the cause of the increase and the source and extent of VOCs at 85F have not been determined. Moreover, VOCs have increased in recent sampling. Additional wells may be required to determine the full extent of the VOC plume near IR29MW85F. Also, please add pesticides and metals to IR29MW85F.**

Table 7F indicates that well IR29MW85F was proposed for analysis of both VOCs and pesticides. In response to ARC Ecology's specific comment 2 (Comments dated February 3, 2003) on other monitoring locations at Parcel C, the Navy has agreed to sample well IR29MW85F for analysis of molybdenum because concentrations have been detected above the HGAL. Table 7F has been revised accordingly.

- ii) Please include IR29MW48A and IR29MW57A (paired well for IR29MW58F), and analyze for VOCs, pesticides, and TPH. The extent of the plumes in this area has not been adequately confirmed.**

Monitoring wells IR29MW57A and 58F are both completed in the A-aquifer, and monitoring well IR29MW58F is proposed for analysis of VOCs, pesticides, and TPH. The Navy will continue to monitor this area as stated.

- iii) Please include IR30MW01F, 02F, 03F and 04F and analyze for VOCs, metals, and SVOCs (only one sampling round at these locations). The extent of the plumes in this area has not been adequately confirmed.**

The Navy may monitor some of these wells in the future as indicated in Table H-5.

- iv) Please include IR50MW13F and PA50MW04A and analyze for VOCs, SVOCs, pesticides and metals (only one sampling round since 1995).**

Only metals have been detected at concentrations above criteria in samples collected at monitoring well IR50MW13F, aside from a detection of Aroclor that was not repeated. However, there is no recognized industrial source for metals in the areas nearby monitoring well IR50MW13F, therefore the Navy does not intend to sample monitoring well IR50MW13F. Table H-5 indicates that well PA50MW04A may be monitored in the future for VOCs.

- v) At PA50MW03A, add metals, CrVI, and cyanide (some detections, not a lot of samples, and close to the Bay).**

Table 7F indicates that well PA50MW03A will be sampled for analysis of cyanide, along with VOCs. (Well PA50MW03A is considered in the sections on RU-C1.) Cyanide was not detected in well PA50MW03A in 1993; it was detected in this well in 1996, at 1.2 µg/L; and was not detected in this well in 2002, the most recent cyanide data for this well. Total chromium was detected once from a groundwater sample collected at well PA50MW03A but was not detected in three other sampling events. Additionally, three samples from well PA50MW03A were analyzed for hexavalent chromium. Hexavalent chromium has not been detected in monitoring well PA50MW03A.

vi) Include IR58MW24F and 25F, analyze for VOCs and metals (including CrVI).

Table H5 indicates that well IR58MW24F may be sampled in the future for analysis of selected metals. VOCs have never been detected in groundwater samples collected from monitoring well IR58MW24F. Table 7C indicates that monitoring well IR58MW25F will be sampled and groundwater will be analyzed for total chromium, hexavalent chromium, and VOCs. (Well IR58MW25F is addressed in the section on RU-C2.)

vii) Please include IR64MW05A. Add metals and cyanide (only 2 sampling rounds and adjacent to Bay).

Table 7F indicates that monitoring well IR64MW05A will be sampled and analyzed for the presence of VOCs only. Well IR64MW05A has not been sampled for the presence of cyanide. Metals have not been detected at levels above HGALs in groundwater samples collected at this well, nor is there a potential source for metals at this well.

Specific Comments on Parcel D

1. **Comment:** Source information. Very little source information is included on Parcel D figures, especially when compared to other parcels. Removal areas (RAs), USTs, and ASTs are not shown (except for one UST at IR38): please revise figures to include source information.

Response: The SAP is not intended to provide information on sources. Instead, information on sources was provided in the GDGI reports, which have been reviewed by the DTSC. The Navy has addressed all comments on those reports, which are now final. Therefore, these reports will not be revised. However, the Navy will consider adding additional information on sources for Parcel D in the next annual groundwater monitoring report.

2. **Comment:** Proposed well locations IR09MW61F, 62F, 63F and IR71MW04A are acceptable. Please amend the Rationale and Comments column and the Screened Intervals column to specify that the well screens should extend above the high water level.

Response: These wells have been recently installed. These wells have been removed from Table F-2 and have been added to Table F-1. The screens of these wells were installed at 10 to 20 feet bgs. The tops of these screens may not be above high, or wet season, water levels. Depth to groundwater measurements taken in February of 2002 at IR-09 ranged from approximately 7 to 9 feet bgs. The Navy disagrees that the high water level should be within the screen intervals of these wells. Such a configuration is important for LNAPL detection, but not for dissolved contamination. These wells have been installed to monitor dissolved chromium and chlorinated compound plumes.

3. **Comment:** New wells (IR09MW61A, 62A, 63A and IR71MW04A) should be sampled for the full suite of analytes.

Response: The purpose of the new monitoring wells is to provide specific data for analytes or analyte groups at particular locations. The new wells are not intended for initial investigation of contaminants in groundwater, and the Navy does not agree that it is necessary to sample all new wells for the full suite of analytes. The three new IR-09 monitoring wells will be sampled for chromium, hexavalent chromium, and VOCs (along with salinity, TSS, and total dissolved solids [TDS]). IR71MW04A will be sampled for VOCs (along with salinity and TDS).

4. **Comment:** Recently installed paired wells should be included for annual or bi-annual sampling (e.g., IR34MW36A, 36B, 37A, 37B): these wells have a limited data set.

Response: The Navy believes that the rationale for excluding these wells provided in Table H-6 is valid.

5. **Comment:** In the IR09/33 area, the nickel (Ni) plume should be acknowledged. The nickel plume is depicted in P1GDGI Figures 10A-5 and 6. The Ni plume is coincident with the CrVI plume, and also with barium (Ba), lead (Pb), cobalt (Co), vanadium (V) and cyanide exceedences. IR09/33 wells should be sampled for CLP metals as well as CrVI. Please add wells IR09P043A and PA33MW37A to the IR09 monitoring program so that the full extent of the combined Ni/CrVI plume will be monitored. Sample PA33MW37A for cyanide (as the farthest south plume well).

Response: The Navy has added wells to monitor chromium VI at IR-09. The new wells and the wells currently selected will be used to address the analytes referenced in the comment above.

6. **Comment:** Add VOC sampling to IR09MW45F: VOCs have been measured in this well (e.g., PCE at 10 ug/L on P2GDGI Figure 4-19). The known extent of the VOC plume should be shown on a figure.

Response: Figure 4-19 in the Phase II GDGI Parcel D (Tetra Tech 2002) report is for concentrations of nitrate as nitrogen. Figure 4-25 shows concentrations of PCE at well IR09MW45A as non-detect, with a detection limit of 0.5 µg/L. PCE has never been detected in samples collected at well IR09MW45F.

7. **Comment:** IR09MW51F should be analyzed for nitrate.

Response: The Navy determined that off-site analysis of groundwater collected from monitoring well IR09MW51F for ORP parameters such as nitrates would not at present assist in evaluating concentrations of chromium and TCE at this well. Groundwater collected from this well has been analyzed for nitrate four times in the past.

8. **Comment:** The metals plume at Building 439 should be acknowledged. This plume is characterized primarily by manganese (Mn: P2GDGI Figure 4-10), but also includes thallium (Tl), cadmium (Cd), and TPH. To monitor this plume, please include IR67MW04A, IR36MW16A, IR38MW01A, IR44MW08A and IR08MW44A, and sample for metals and for TPH.

Response: The Navy's strategy for analysis of metals in groundwater is to sample wells where there is a potential for an industrial source, such as along the shoreline.

9. **Comment:** IR22 area. Please sample IR22MW16A and 20A for CLP metals and CrVI. These wells are close to the shoreline and multiple metals have been measured above criteria (P1GDGI Figures 10A-1 et seq., and P2GDGI Figures 4-1 et seq.) in the IR22 vicinity or upgradient of IR22.

Response: Wells IR22MW16A and IR22MW20A are both to be sampled for analysis of selected metals. Hexavalent chromium has never been detected in a monitoring well at IR-22. The Navy has already proposed sampling of several monitoring wells at IR-09 for analysis of hexavalent chromium.

10. **Comment:** IR33MW61A: sample for pesticides.

Response: As indicated in Table 7C, pesticides have not been detected in at least three samples collected over the wet and dry seasons. The Navy does not believe that this well warrants additional sampling for analysis of pesticides.

11. Comment: IR34MW01A: sample for metals (including CrVI).

Response: As indicated in Table H-6, this well may be sampled for analysis of metals in the future.

12. Comment: Sample IR38MW02A and IR33MW121B for zinc.

Response: Concentrations of zinc for well IR38MW02A were 100 µg/L for a sample collected on October 24, 1994, and nondetect for both samples in 1996 (Figure 4-17 in revised information package for Parcel D, Phase II GDGI, March 8, 2002). Well IR33MW121B was not sampled for analysis of zinc; however, the concentration of zinc in the paired A-aquifer well, IR44MW08A, was only 20.8 µg/L. The HGAL for zinc is 75.68 µg/L. Therefore, the Navy does not believe that these wells warrant additional analysis for zinc.

13. Comment: The IR08 PCB spill area has not been sampled since 1994, despite the fact that PCBs have been left in place above screening criteria and PCBs (and Hg and Cu) have been measured in groundwater above criteria. The critical well (IR08MW42A, adjacent to the former pump station) has been removed. Please sample three wells surrounding the removal action area (IR08MW37A, 40A, and 41A) for PCBs, Hg, and Cu. Cu exceedences of aquatic criteria are highest in IR08 area and extend in the direction of the shoreline.

Response: Concentrations for Aroclor-1260 in samples from the decommissioned well, IR08MW42A, were 4 µg/L in the sample collected on October 7, 1991, 1 µg/L in samples collected on December 20, 1991, and nondetect in the four samples collected between 1993 and 1994. Concentrations in samples collected at all surrounding wells, including IR08MW37A, 40A, and 41A, were nondetect (Figure 4-34 in the revised information package for Parcel D, Phase II GDGI, March 8, 2002). Therefore, the Navy does not believe that these wells warrant additional sampling for analysis of PCBs.

Copper concentrations at IR08MW37A exceeded the HGAL once in 1990 and the four most recent results have not exceeded the HGAL. Copper concentrations at both IR08MW40A and IR08MW41A have never exceeded the HGAL.

Mercury concentrations at IR08MW37A exceeded the HGAL once in 1991 and in the six most recent results either mercury was not detected or mercury concentrations were less than the HGAL. Mercury was never detected at concentrations above the HGAL at either IR08MW40A or IR08MW41A. Mercury had been detected at both wells at concentrations below the HGAL in 1993 but mercury was not detected in subsequent samples from both wells.

The Navy does not agree that it is necessary to sample IR08MW37A, IR08MW40A, or IR08MW41A for copper or mercury.

The Navy has stated that wells selected for groundwater monitoring nearby bay margin fill will be sampled and analyzed for metals.

14. **Comment:** Add TPH to PA50MW07A.

Response: As stated in Table 7-G, TPH was detected at concentrations equal to or below the criterion of 1,400 µg/L; therefore, additional samples will not be analyzed for TPH.

15. **Comment:** An iron and TPH plume exists at IR50MW14A and 15A, which is near to the shoreline. Hg was also elevated in this area. The area has not been sampled since 1996: additional sampling for metals and TPH may be prudent.

Response: As stated in Table 7-G, elevated concentrations of iron are likely related to ongoing biodegradation of TPH; in addition, TPH was detected at concentrations equal to or below the criterion of 1,400 µg/L. Therefore, additional samples will not be analyzed for TPH. Mercury concentrations at IR50MW14A were above the HGAL once in 1994 but mercury was not detected in the three most recent groundwater samples from IR50MW14A. Mercury was never detected at IR50MW15A and the Navy does not agree that there is a need to continue to monitor for mercury at IR-50.

16. **Comment:** Other areas with exceedences, small data sets, and no recent data are mentioned in Table H-6: some are near the shoreline. Sampling of such areas may be prudent.

Response: In Table H-6, the Navy has provided the rationale for excluding each well listed in the table and believes that the rationale is valid.

Specific Comments on Parcel E

1. **Comment:** IR01/21: Landfill Area

- a. **Review of Title 27 proposals is deferred to RWQCB.**

Response: The Navy acknowledges this comment.

- b. **Please provide a rationale for not sampling inside the landfill. Continued monitoring would provide useful information on contaminant migration, especially since recent and anticipated actions (e.g., capping, barrier wall) and changes to the pumping systems might have a decided affect on contaminant migration.**

Groundwater sampling inside the extent of waste of the landfill is included as part of the BGMP. A total of 14 A-aquifer wells and seven B-aquifer wells were selected for groundwater sampling to monitor chemicals that have been detected in the past and to establish a baseline for other chemicals and water quality parameters that may be related to the landfill. Of the groundwater wells selected for sampling, six of the A-aquifer wells and three of the B-aquifer wells are located within the extent of waste of the landfill. Additional wells may be installed near the landfill in the future.

In addition, groundwater levels will be measured quarterly in all 284 wells measured during the Phase III GDGI on February 20, 2002, and in 82 additional wells, for a total of 366 wells. These basewide groundwater measurements will help the team evaluate changes in the direction of groundwater flow.

- c. **Please include IR01MW38A for Title 27 analysis: there is no well downgradient from 38A to monitor the edge of contamination at the Bay margin.**

Well IR01MW38A has been added for Title 27 constituents as requested. Table 7H and Figure 11 have been changed accordingly.

- d. **Ship shielding area (SSA). Very little information has been provided on the SSA, which was only recently recognized as a potential source area (previously it had been incorrectly identified from aerial photographs as a skeet range). The soil in the SSA has not been fully investigated. Please provide a description of activities in the SSA, including a list of potential contaminants for SSA operations. At the minimum, additional wells should be installed in the SSA and downgradient of the SSA near the Bay margin (i.e., between IR01MWI-7 and I-8).**

The former ship shielding area, located between monitoring wells IR01MWI-9 and IR01MW62A on the panhandle of IR-01/21, will be addressed in the draft final HRA. In addition, the Navy will take

appropriate response actions based on the findings of the HRA. The Navy, however, has proposed groundwater sampling at four wells located around the perimeter of the former ship shielding area: IR01MWI-6, IR01MWI-7, IR01MW58A, and IR01MW62A.

- e. **With respect to VOC contamination, concerns are elevated since the inhalation pathway is a critical pathway for risk assessment, and lower values are currently required to be protective. Also, changes in groundwater migration are expected to accompany removal actions and changes to the pumping regime. Such changes must be monitored closely to determine whether risks to human health have increased or decreased as a result of such actions. Continued monitoring is recommended so that a very robust data set will be available for FS discussions and decision-making.**

It is necessary to monitor for VOCs in areas that are occupied (i.e., UCSF compound) and in areas that are adjacent to residential reuse areas (i.e., IRs 04, 56, 72, 74, 75). Requests for groundwater sampling for VOCs in these areas (made by DTSC in previous comments) have been deferred by the Navy to the BGMP. However, sampling proposed in the BGMP is not adequate. Please include all wells north of the barrier wall (i.e., Gund™ curtain) and analyze for VOCs (and other historic contaminants). For example, please include IR72MW33A and IR76MW13A.

Well IR01MW10A is located less than 100 feet cross-gradient of well IR72MW33A and near the edge of waste of the landfill. B-aquifer well IR75MW05B is included in the network of groundwater sampling wells, as shown on Figure 11. The Navy has added well IR76MW13A for analysis of VOCs, and Table 7H and Figure 11 have been modified accordingly. IR74MW01A will also be sampled for VOCs, as requested.

- f. **Similarly, please include IR01MWI-2 and analyze for VOCs: this well is adjacent to a residential reuse area.**

This well has not been chosen for monitoring as part of the BGMP. Three A-aquifer wells (IR01MW367A, IR01MW366A, and IR04MW13A), each located approximately 100 feet cross- and down-gradient from well IR01MWI-2, are included in the groundwater sampling well network, as shown on Figure 11.

- g. **Confirm that IR12MW11A will be analyzed for VOCs: the VOC box is not "x"ed in Table 7I.**

Groundwater samples collected from well IR12MW11A will be analyzed for VOCs. Table 7I has been corrected.

- h. **Include IR01MW09B for Title 27 analysis (including VOCs): VOCs have been measured in this edge-of-plume, B-aquifer well.**

Well IR01MW09B was included for monitoring in Table 7L and on Figure 14 in the draft SAP. In the final SAP, this well has been moved from Table 7L to Table 7H, its selection has been moved from Figure 14 to Figure 11, and all Title 27 analytes are specified for analysis.

- i. **Requests for additional wells for VOC analysis in IR12 (near to residential reuse areas) are included in Other Areas Northwest.**

The Navy acknowledges this comment.

- j. **Include IR01MWI-6 for VOC analysis: VOCs have been measured in adjacent off-site well IR01MW402A.**

VOCs have been added to the analytical suite for well IR01MWI-6, and Table 7I has been modified accordingly.

- k. **Please analyze the following wells for all metals (not a subset of metals): IR01MWI-7, I-8, 62A, and 63A.**

Full analysis for metals has been added for wells IR01MWI-7, IR01MWI-8, IR01MW62A, and IR01MW63A, and Table 7I has been modified accordingly.

- l. **Stainless steel (SS) wells should be evaluated for nickel (Ni) leachability.**

The Navy does not plan to evaluate stainless steel wells for nickel leachability. This factor was previously evaluated: (1) ten stainless steel wells are located at the landfill, (2) three of these wells were sampled for analysis of nickel in March 2001, (3) one of these wells were found to contain nickel above the HGAL of 96.48 milligrams per liter (mg/L), and (4) concentrations of nickel in samples from these wells ranged from 1.8 to 13.60 mg/L.

2. Comment: IR02 Northwest Bay Fill Area

- a. **This large "disposal area" has some of the highest concentrations of soil contaminants measured on site. For example, copper at 37,000 ppm and PCE at 620 ppm have been measured. Soil data from recent investigations (including data on the copper and PCE hotspots) have not been received and reviewed: so, pending review, additional groundwater monitoring or investigation may be required.**

Response: The Navy acknowledges this comment. The Navy will continue to work with the agencies on this voluntary BGMP and will address agency comments when they are received.

- b. **Possible holes in the aquitard have not been evaluated. VOCs were disposed in the area and DNAPLs have not been ruled out. Only one B-aquifer well exists in this large area, which is not adequate to monitor for DNAPLs.**

Cross-section A-A' on Figure 3-2A in the Phase III GDGI report for Parcel E (Tetra Tech 2003e) shows a continuous and at least 30-feet-thick clay aquitard across the Northwest Bay Fill area.

Additionally, dissolved VOCs at well IR02MW127B have not been detected at concentrations above 1 percent of the pure-phase aqueous solubility for the compounds, the level where EPA suggests potential for DNAPL exists (EPA 1992). Based on EPA guidance and the lack of other indications of DNAPL in the extensive data for soil and groundwater from the area, the Navy does not intend to install additional wells to test for DNAPL.

- c. **No monitoring wells are located on or downgradient of the “new firing range”, which is directly adjacent to the Bay. Soil sources in this area have also not been fully investigated. This data gap should be addressed: an additional shoreline well would be prudent.**

Well IR02MWB-2 has been proposed for groundwater monitoring and is located downgradient on the Bay side of the firing range. A “new firing range” does not exist at HPS.

- d. **Groundwater flow is dominated by an elliptical mound centered at IR02MW114A1: the mound is likely caused by blocked storm lines. Flow is outwards towards the Bay and also inwards towards the depression controlled by Pump Station A. No monitoring is proposed downgradient in the direction of Pump Station A (except at distant locations) or downgradient of Triple A Site 19 (an oily waste disposal area). At the minimum, wells IR02MW114A1, A2, and A3 (at the high point of the mound) should be included and analyzed for metals so that changes in concentrations will be monitored as storm and sanitary systems are abandoned or changed.**

The Navy acknowledged the possibility in the Phase III Parcel E GDGI report that the groundwater divide around well IR02MW114 may be related to utility lines. However, the Navy does not choose to predict where or whether patterns in groundwater flow will change as a result of alterations to the utility system. Patterns of groundwater flow will be monitored quarterly and the selection of wells in this area for the BGMP can be adjusted accordingly if necessary.

- e. **Please include IR02MWC-5, suggested for future monitoring in Table H-7, and analyze for VOCs and metals.**

The Navy has agreed to sample well IR02MWC-5 for analysis of copper and VOCs. Tables 7J and H-9 and Figure 12 have been revised to reflect the sampling proposed for well IR02MWC-5.

- f. Please add IR02MW372A and 373A and analyze for full suite of analytes: contaminants in these wells and upgradient will likely move towards the Bay when the groundwater mound at 114A1 changes.**

Quarterly monitoring of groundwater elevations will be used to evaluate whether groundwater flow changes from its usual patterns over approximately the past decade. If flow patterns do change near the mound at well IR02MW114, then the proposed sampling network will be used to evaluate whether the altered flow patterns are causing contaminant migration, and the plan can then be changed.

- g. Please add metals to 141A and 127B: contaminants in these wells and upgradient will likely move towards the Bay when the groundwater mound at 114A1 changes.**

Quarterly monitoring of groundwater elevations will be used to evaluate whether groundwater flow changes from its usual patterns over approximately the past decade. If patterns of flow change in the vicinity of the mound at well IR02MW114, then the proposed sampling network will be used to evaluate whether the altered flow patterns are causing contaminant migration. The plan can then be changed.

- h. SS wells IR02MWB-1 to B-4 should be evaluated for Ni leachability. For example, Ni has been measured in IR02MWB-2 at up to 1,720 ug/L and in IR02MWB-5 at up to 9970 ug/L.**

Monitoring well IR02MWB-4 does not exist. Concentrations of nickel in samples from monitoring wells IR02MWB-1, IR02MWB-2, IR02MWB-3, and IR02MWB-5 have exceeded the HGAL. The Navy will consider decommissioning and replacing these wells as part of a planned removal action. Tables 7J, 7K, and 7M have been revised to indicate that these wells may be decommissioned in the future.

- i. Pesticides (e.g., aldrin, dieldrin) have exceeded criteria along shoreline: pesticides should be added to shoreline wells.**

Aldrin was not detected at the industrial landfill area, but dieldrin was detected in samples collected at wells IR01MWI-3, IR01MW43A, and IR01MW44A. Table 7H indicates that these three wells will all be sampled for analysis of organochlorine pesticides.

Aldrin was detected in samples from well IR02MW372A in the northwest bay fill area, and Table H-9 indicates that this well may be sampled in the future for analysis of pesticides.

Neither aldrin nor dieldrin has been detected in groundwater from the oil ponds area.

Dieldrin was not detected at the other areas northwest, but aldrin was detected in samples collected at well IR36MW17A. Table 7L indicates that well IR36MW17A will be sampled for analysis of pesticides.

Aldrin was not detected in the other areas southeast, but dieldrin was detected in samples collected at well IR39MW21A. Table 7M indicates that well IR39MW21A will be sampled for analysis of pesticides.

3. **Comment:** **IR03**

- a. Since no well exists north of IR03MW146A, the full extent of LNAPL (and the TPH plume) has not been determined to the north (which is downgradient of the oil ponds). It may be necessary to install another well.

Response: The Navy does not plan to install new wells at IR-03 as part of the BGMP; however, additional wells are being evaluated to support future treatability studies at IR-03.

- b. Groundwater flow directions for the A-aquifer at both ends of the sheetpile wall (Figures 13, et seq,) are improbable and are not consistent with (i.e., not perpendicular to) groundwater contours shown for February 20, 2002 (Figure 3-11) and for other dates. Groundwater south of the sheetpile wall should be shown as migrating towards the Bay—not towards the groundwater low caused by Pump Station A. Please revise figures accordingly.

Figure 13, as well as Figures 5, 6, 7, 11, 12, and 15 have been revised to show groundwater flow directions based on the groundwater elevation contours for February 20, 2002.

- c. Well construction details are not provided for some product-containing wells in Table F-2, including IR03MW225A, 226A, and 370A, and IR03MW0-1 to 0-3. Please provide such information in Table F-2. If records do not exist (and why don't they exist?), is it possible to determine screen lengths and screened intervals by inspection of the wells?

The comment should refer to Table F-1 instead of Table F-2. The missing information has been added to Table F-2 in the final SAP.

- d. IR03MW373B is screened across a clay/silt zone in the middle of the B-aquifer: it does not monitor the bottom of the B-aquifer. DNAPL (if it exists) from the oil ponds may "dive" to deeper zones, following the steep bedrock surface and migrate below the screen of 373B. That is, 373B may not be adequate to check for DNAPL migration from the oil ponds.

Monitoring well IR03MW373B was not installed to monitor for the presence of DNAPL, moreover the well was installed for the purpose of aquifer testing and monitoring the B-aquifer.

- e. B-aquifer well IR03MW228B should be analyzed for the full suite of analytes.

The Navy considers existing data for this well sufficient for the FS. VOCs are proposed for analysis to confirm a single detection of TCE in a sample from this well. Samples from this well will not be analyzed for the full suite of analytes.

- f. **Table 7-K says that shoreline wells IR03MW369A, 370A, and 371A will be sampled beneath the LNAPL for PCBs, using an alternative technique. Please clarify whether other analytes (i.e., VOCs, TPH, metals) will also be sampled for? If not, please explain. That is: If it is appropriate to sample for PCBs, using an alternative technique (for sampling beneath LNAPL), why isn't it appropriate to sample for other analytes?**

The Navy does not consider dissolved concentrations of contamination from a monitoring well that contains free product to be useful information. Where this exists, the Navy will not sample groundwater from wells that contain free product. Table 7K will be revised to show that wells IR03ME369A, -370A, and -371A will not be sampled for any constituents.

- g. **Similarly, the Rationale provided for not sampling several other wells is that LNAPL exists in the wells (Table H-10). Please explain why it is not appropriate to use the alternative technique on other LNAPL wells (e.g., 173A and 146A).**

Please see the Navy's response to DTSC Parcel E comment 3f.

- h. **IR03MW218A1 and 218A3 are described as "redundant" to 218A2 (Table H-10). However, this triplet of wells was installed at different depths, for the purpose of monitoring potential migration to deeper zones. Concentrations vary across the three screened intervals. So, how can the wells be "redundant"? Please explain. Also, a downward vertical gradient exists in the area (Figure 3-14), which argues for inclusion of 218A1 and 218A3.**

Although concentrations vary across the three screened intervals for wells IR03MW218A1, 2, and 3, chemicals detected in samples from well IR03MW218A2 are similar to results for wells A1 and A3. Consistently higher detections of these chemicals also have been detected in samples from well IR03MW218A2. Therefore, well IR03MW218A2 has been chosen for inclusion in the network of groundwater monitoring wells for the BGMP. Monitoring wells IR03MW218A1, -A2, and -A3 are selected for quarterly groundwater level monitoring.

- i. **IR03MW218A2 and 371A should be analyzed for all metals, since sandblast grit, waste oil, and industrial waste was disposed in IR03.**

Table 7K has been revised to indicate that IR03MW218A2 will be monitored for the full suite of metals. As previously stated, the Navy will

not sample within a well that contains free product as has been observed in IR03MW371A

- j. **Well IR03MW0-1, proposed for future sampling (Table H-10), should be included in the BGMP and analyzed for the full suite of analytes.**

To avoid duplication, the Navy has proposed limited groundwater sampling and analysis for IR-03 because this site is expected to be extensively sampled during treatability studies that are planned.

- k. **IR02MW97A, proposed for future sampling (Table H-10), should be included in the BGMP and analyzed for VOCs.**

No VOCs were detected in recent sampling events (2002) at levels above screening criteria for well IR02MW97A. TCE was detected at concentrations above the criteria in 2001, but has not been detected in samples collected during two subsequent sampling events in 2002 (where the detection limit was 0.5 mg/L). Based on these data, the Navy is not proposing to include this well in the network of groundwater monitoring wells for IR-03.

- l. **For IR03MW371A, no LNAPL is indicated on Figure 6-4 but LNAPL is indicated in Table 7-K. Please clarify whether there is LNAPL in 371A. Revise Figure 6-4 and Table 7-K, accordingly.**

Only a sheen of LNAPL has been measured at well IR03MW371A, with a thickness of less than 0.01 foot in 2002. As stated in the Figure 6-4 legend, only wells where the measured thickness has exceeded 0.1 in 2002 are shown as containing LNAPL on Figure 6-4 of the Phase III GDGI report.

- m. **The location of IR03MW369A on Figure 13 is not consistent with the location shown in GDGI Figure 6-2 and RI Figure 4.6-3. Please correct.**

The location of the well IR04MW369A on Figure 13 of the draft SAP is correct. It is incorrect on the figures in the GDGI and RI figures because the location was incorrectly surveyed.

4. **Comment: Other Areas Northwest**

- a. **Other VOC plumes. The reuse categories for the northern portion of "Other Areas Northwest" are "mixed" and "research and development", both of which require residential risk assessments--for which inhalation of VOCs is a critical pathway. Also, Parcel A, directly adjacent to the north, is in the "residential" reuse category. Moreover, property transfer is scheduled in the near future and additional data will help to resolve any lingering "adjacency" issues. To ensure an adequate data set for risk**

assessment, all wells with VOC detections should be analyzed for VOCs.

In addition, it is essential to monitor VOC plumes during anticipated changes to the sanitary system pumping regime.

Two additional VOC plumes (not shown on Figure 14) may exist in this area: 1) a rather diffuse, low-level plume under IR04 and IR56; and, 2) a plume under and adjacent to IR12. Trenches on IR12 were used to dispose hazardous liquids, including VOCs. The extent and variation of VOCs in IR12 area is not fully understood.

Several wells in Table H-11 (suggested for future sampling) should be included for VOC sampling in the BGMP. These are: IR04MW35A, IR04MW38A, IR04MW40A, IR05MW76A, IR12MW13A, IR12MW14A, IR12MW15A, IR12MW16A, IR12MW20A, IR36MW14A, and PA50MW10A (including MTBE). Also, please include IR12MW17A, IR12MW19A, and IR04MW13A (which are outside "Other Areas Northwest").

Response: The Navy disagrees that samples from all wells where VOCs have been detected should be analyzed for VOCs. The Navy has agreed to sample wells IR12MW13A and IR12MW14A, the two locations at IR-12 where VOCs were detected during the Phase III investigation. Tables 7L and H-11 and Figure 14 have been revised to indicate that sampling of these two monitoring wells is proposed.

b. A shallow bedrock knob underlies Building 406 VOC source areas, with steep slopes in all directions (P3GDGI Figure 3-4). DNAPL, therefore, could potentially migrate in many directions. VOCs have been measured in B-aquifer wells. B wells exist on three sides, but no B wells exist to the south-southwest. Another B well to the SSW is recommended.

Dissolved VOCs have not been detected at the three existing B-aquifer wells in the area of Building 406 (IR36MW120B, IR36MW123B, and IR36MW129B) at concentrations above 1 percent of the pure-phase aqueous solubility for the compounds, the level where EPA suggests the potential for DNAPL exists (EPA 1992). Based on EPA guidance, the Navy does not intend to install additional wells to test for DNAPL at the area of Building 406. Future plans for this site include additional wells to support a treatability study.

c. More detailed site-specific cross sections should be provided for the Building 406 area. (Cross sections provided in the P3GDGI do not extend into the Building 406 area.)

The Navy will evaluate the need for additional hydrogeological cross-sections for the area of Building 406 in support of future treatability studies.

- d. VOC soil source areas exist on both the west and east sides of Building 406. On the west, TCE has been measured at 49 mg/kg (RI Figure 413.4: IR36B016, 16.25 fbg) and on the east, TCE has been measured at 9.7 mg/kg (IR36B071, 11.25 fbg). A TS has been conducted on the west side: as a result, more data (not reviewed by DTSC) is presumably available regarding the extent of the source on the west side of the building. However, the extent of the soil source on the southeast (adjacent to the Parcel D/E boundary) has not been determined.

Reports on the treatability studies will be presented elsewhere. The Navy evaluated contaminant concentrations in groundwater in the GDGI reports and has designed the proposed BGMP based on previous concentrations in groundwater and on the hydrogeological conceptual model. Additional soil data has been collected and will be used to support the FS or a treatability study.

- e. Additional groundwater monitoring for VOCs is requested to the south southeast: please add PA36MW04A and IR36MW14A.

Table H-11 indicates that both wells PA36MW04A and IR36MW14A may be monitored in the future for VOCs.

- f. To determine the northern edge of the plume, please add VOCs to IR36MW17A.

VOCs have never been detected in samples collected at well IR36MW17A. Table 7L has been revised to indicate that this well may be monitored in the future for VOCs if the northern boundary of the Building 406 plume needs further definition.

- g. To the northwest, in PA36MW03A, metals were measured in 03A up to ten times the HGAL (Appendix H). Please add 03A and sample for VOCs, pesticides, and CLP metals.

Table H-11 indicates that this well may be monitored in the future for copper, zinc, and VOCs.

- h. SVOCs should be added to wells with SVOC detections above criteria (e.g., 1,4 DCB in IR36MW120B).

Well IR36MW120B will be sampled for analysis of VOCs, as indicated in Table 7L. In Table 8, footnote "c" indicates that 1,4-DCB will be included with the analyses for VOCs.

5. **Comment: Other Areas Southeast**

- a. Low-level VOC plumes (not shown on figures) exist in this area. It is necessary to track VOC contamination as flow directions change in response to changes in pumping regimes. Some wells are proposed for sampling in plume areas but others are not. Wells suggested for future VOC sampling in Table H-12 should be

included for VOC sampling in the BGMP. Please include: IR02MW299A, IRMW1311A, IR14MW13A (also SVOCs and TPH), IR15MW07A and 09F, IR39MW33A and 35A. IR39MW23A should also be included. IR39MW33A should be analyzed for metals also.

Response: Table H-12 indicates that these wells may be sampled in the future for analysis of VOCs. These wells will be considered for sampling after the evaluation is completed in the annual report.

b. Please analyze for cyanide in PA50MW09A.

Cyanide has never been detected in samples collected at well PA50MW09A. Furthermore, this well is not located near well PA50MW08A, which is the only other southeast location where cyanide has been detected. Table H-12 indicates that well PA50MW08A may be monitored in the future for cyanide.

c. All exceedences noted in Table 7M should be shown on Figure 8-2.

Figure 15 is the map of the Other Areas Southeast. Figure 8-2 does not exist in the draft SAP, which is the topic of this set of comments. The area-specific figures that show proposed networks of wells for groundwater sampling are not intended to illustrate chemical concentrations. Please refer to figures in the Phase III GDGI reports for graphical illustration of chemical concentrations.

d. IR02MW206A2 is proposed for monitoring of cadmium (Cd) exceedences which were measured in paired well 206A1. 206A1 (not selected for monitoring) is listed as "redundant" to 206A2 in Table H-12. However, well construction details and well location suggest that 206A1 is not redundant to 206A2. The short shallow well screen interval (2.5 to 7.5 fbs) for 206A1 suggests that 206A1 was installed at the water table to monitor for potential LNAPL associated with the upgradient waste oil tank S-505. Elevated PCBs were measured in this area. Some contaminated soil was left in place when the tank was removed and the area was "capped". Please sample 206A1 for TPH and metals.

Groundwater in well IR02MW206A1 occurs in the sand below 7 feet bgs. Figure 3 shows the groundwater elevation at well IR02MW206A1 to be 0.31 feet above mean sea level (msl), and Table F-1 shows the top of casing (TOC) for well IR02MW206A1 to be 7.43 feet above msl. Therefore, the depth to groundwater is 7.32 feet below TOC. The bottom of the clay in well IR02MW206A1 is 7 feet bgs, so the groundwater is present in the sand below the clay. The sand below the clay extends through the screened interval of well IR02MW206A2, and so the groundwater that occurs in both wells IR02MW206A1 and IR02MW206A2 is comparable. Therefore, as Table 7M indicates, well

IR02MW206A2 will be sampled for analysis of cadmium. TPH has not been detected at either well IR02MW206A1 or IR02MW206A2.

- e. **The extent of the "cap" at former tank S-505 should be shown on figures.**

The area where tank S-505 has been capped will be shown on the appropriate figure.

- f. **DTSC defers to the RWQCB with respect to monitoring for ecologically- sensitive compounds at the Bay margin.**

The Navy acknowledges this comment.

- g. **SS well IR02MWB-5 should be evaluated with respect to Ni leachability.**

Concentrations of nickel at well IR02MWB-5 have exceeded the HGAL. The Navy will consider decommissioning and replacing this well prior to the IR02 removal action. Tables 7J, 7K, and 7M have been revised to indicate that this well may be decommissioned and replaced with PVC well material.

Additional Specific Comments

1. **Comment:** Section 1.1.2 Problem to Be Solved.

Title 27 requirements should be explicitly discussed, including analytical program, compliance wells, etc. The text should demonstrate how the proposed BGMP is fully compliant with 27 CCR requirements for landfills.

All "problems" that need to be solved are not addressed in this section or in the BGMP, as indicated in general comments, above (e.g., the potential "holes in the aquitard" and source data not received).

Response: The requirements from the Title 27 of the *California Code of Regulations* will be discussed in the IR-01/21 RI/FS. The Navy is sampling wells in the area of the landfill for the same suite of analytes required for Title 27 monitoring. The Navy believes that the hydrostratigraphic relationships are adequately defined in the Phase II GDGI reports. Please see the Navy's responses to DTSC Parcel E comment 2b (comments dated March 18) and general comment 11.

2. **Comment:** Section 1.1.3 Facility Background. Operations of the National Radiological Defense Laboratory (NRDL) should be included.

Response: Please see the Navy's response to DTSC Parcel B specific comment 3.

3. **Comment:** Section 1.1.5 Site Description. The site description should include the fact that most of Hunters Point Shipyard was constructed on fill materials (referring to the 1935 shoreline on Figure 3), and that the fill history is largely undocumented.
- Response:** Section 1.1.5 has been revised to include further discussion on the construction of HPS above fill materials.
- 4 **Comment:** Section 1.1.6 Summary of Previous Investigations. In the second sentence, after "corrective action plan", please add: "(CAP), under the oversight of the California Regional Water Quality Control Board, San Francisco Bay Region".
- Response:** The second sentence in Section 1.1.6 has been revised according to the comment.
- 5a. **Comment:** Section 1.1.6.2 Parcel B Remedial Action Monitoring Plan. This section describes the ROD components of the groundwater remedy for Parcel B: but, the description of the remedy for groundwater should be expanded: the information provided is not sufficient. The description of the remedy in the ROD (Section 1.4) includes sentinel wells, compliance wells, criteria, etc.
- Response:** As stated in Section 1.1.6, Section 1.1.6.2 is intended to be a brief overview of groundwater investigations. Please refer to Section 4.0 for further information on the RAMP.
- 5b. **Comment:** Section 1.3: Quality Assurance and Quality Control (QA/QC). DTSC defers to USEPA with respect to QA/QC. DQOs are discussed above.
- Response:** The Navy acknowledges this comment.
6. **Comment:** Section 1.5 Special Training and Certification (may also relate to Section 1.1.8 Technical or Regulatory Standards). With respect to asbestos, the Air Resource Board's (ARB's) Final Regulation Order Section 93105 applies to any construction activities in serpentinite and ultramafic rocks and soil: these orders may be applicable to drilling and other field activities at Hunters Point. For example, notification, air sampling, and dust control measures are discussed in the regulations. It is recommended that the Navy contact ARB for clarification regarding applicability of the order with respect to BGMP field work. The regulations are at: <http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm>.

Response: The Air Resources Board's order does not contain requirements that apply to well drilling for remedial investigations. The Navy, however, recognizes that drilling in serpentinite bedrock at HPS could pose an asbestos hazard. Text has been added to Section 8.2.1, first paragraph, stating that (1) drilling in bedrock at HPS may pose an asbestos hazard, (2) measures will be taken to prevent exposure of field personnel to asbestos, and (3) bedrock cuttings will be handled to prevent potential release of asbestos to the environment.

7. **Comment:** Section 7.1. Please correct the text to say "**grass and subsurface fire**" and smoldering **subsurface** fires". (Emphasis added)

Response: Section 7.1 has been revised to indicate that the fire at the landfill in 2000 was a grass and subsurface fire rather than a grass fire.

8. **Comment:** Low flow sampling and purging (Section 8.3.4.2)

a. Sampling and purging should be consistent with ASTM standard practice for low flow purging and sampling (D6771). This method is a minimum drawdown method. There is some disagreement regarding allowable drawdown (Section 8.5.4). Puls and Barcelona recommend .33 foot (when achievable), and D6771 says that drawdown should never exceed 1.25 feet for a ten foot well-screen (a common screen length at Hunters Point). The BGMP proposes an allowable drawdown of .33 foot at a discharge rate of .15 L/min--which is similar to Puls and Barcelona: this amount is conservative based on the discussion in D6771, which allows for larger drawdown. If the larger allowable drawdown of the D6771 is used in the BGMP, then the Navy's proposed "modified low-flow purging protocol" may be moot or may require different thresholds.

Response: Please refer to the Navy's response to both EPA specific comment 8 (Comments dated February 2, 2004) and DTSC Parcel B specific comment 8.

b. Purging and sampling should ideally be conducted at a rate less than or equivalent to the recharge rate (and the development rate). The standard recommends that a well-specific optimum pumping rate should be determined prior to sampling and that the well-specific optimum rates should be used each time the well is sampled (Section 8.4.2). Optimal pumping rates should be included on the well construction spreadsheet. Typical rates are 0.1 to 0.5 L/min. DTSC recommends sampling for VOCs (and other pressure-sensitive compounds) at .1 L/min.

Please see the Navy's response to both EPA specific comment 8 (Comments dated February 2, 2004) and DTSC Parcel B specific comment 8.

- c. **Peristaltic pumps are not recommended (Section 7.1) for sampling "VOCs and other pressure-sensitive compounds (for example, dissolved oxygen, carbon dioxide, trace metals)": continuous discharge and cyclic discharge pumps "work equally well".**

Peristaltic pumps will not be used for sampling. The Navy will use electrical submersible pumps.

- d. **Samples collected pursuant to low flow purging standards should not be filtered, since the method serves to "directly quantify the total mobile contaminant load" (Section 6.1.5), thus providing samples which are appropriate for risk assessments (human and ecological).**

If it is necessary to sample with a bailer because of aquifer conditions at a specific well, samples may need to be filtered. The Navy does not intend to filter samples collected via low-flow methods. Section 8.3.4.4 has been revised to clarify when filtering of samples may be appropriate.

- e. **The proposed modified method uses "micro-surges" to apply and release back pressure to the water column. As such, it may result in increased agitation and pressure variations in the small volume of groundwater which is to be sampled, which is contrary to the intent of low flow purging and sampling. VOC loss, degassing, and redox and pH changes may result. Please provide references and further discussion in support of "modified low flow purging" described.**

The text does not describe the term "micro-surges". Please see the Navy's response to both EPA specific comment 8 (comments dated February 2, 2004) and DTSC specific comment 8 on Parcel B.

- f. **Reporting requirements for low-flow sampling are specified (Section 9 and elsewhere).**

The reporting requirements detailed in Section 9 of ASTM International standard D6771 will be satisfied by the information provided on the monitoring well sampling sheets and the daily equipment calibration log forms (Appendix B, Field Forms). These field forms will be included in each quarterly report, as indicated in Section 1.6.4.

- 9. **Comment: Standard Purging (Section 8.3.4.3). VOC samples that are collected from wells that have been purged dry are likely to be low-biased: such samples should be flagged.**

Response: The Navy does not intend to flag data based on field sampling conditions. The sampling sheets will be used to confirm the monitoring well collection performance.

10. Comment: **Table C-1**

- a. Change the column title "POC well trigger level" to "Parcel B RAMP POC well trigger level".**

Response: The column heading has been revised.

- b. Footnote "j" is applied to the wrong column.**

Footnote "j" in Table C-1 has been adjusted in the final report.

- c. Footnotes "q" and "r" are discussed elsewhere.**

Please refer to the Navy's responses to DTSC's general comments 6a, 6b, and 6c on Parcel B. The footnotes will be revised to clarify that the trigger levels listed for VOCs are the human health criteria from the ROD and that the Navy will propose updated VOC trigger levels in the Parcel B TMSRA.

11. Comment: **Appendix E Hunters Point Shipyard Data Validation Qualifiers.**
Please clarify what is meant by "historic" results: were the instructions to data validators used in RIs, and/or in subsequent investigations? Review of instructions to data validators is deferred to USEPA.

Response: "Historic HPS data" refers to the majority of data collected from HPS in the past, including during the RI and subsequent investigations.

12. Comment: **Table F-1 Basewide Summary of Construction Details and Current Condition of Monitoring Wells**

- a. All ground penetrations, including wells designated as "piezometers" by the Navy, gas wells, extraction wells and underground storage tank (UST) wells, should be included on this Table and on the CD. Please change the title of the table, accordingly.**

Response: The intent of Table F-1 is to document details on and conditions of groundwater monitoring wells at HPS. The Navy does not intend to add all "ground penetrations" to Table F-1.

- b. The column title "Current Condition" should be changed to "Comments". The intent of the column was to maintain an ongoing record of repairs: so, new information should be added to existing information.**

Table F-1 has been revised so that the heading of the right-most column is "comments," rather than "current condition."

- c. **Measured thicknesses (including sheen) of non-aqueous phase liquids, both dense and light (DNAPLs and LNAPLs) should be added to Table F-1 for each sampling event, creating an ongoing record. On the current table, dates of observation of NAPL are not always clear and variations with time are not discernible. Alternatively, a separate table could be developed showing thickness (and depth) of NAPL for each sampling and inspection event. As accompaniment to the table, figures showing NAPL areas (updated from the RI) should be developed.**

Field forms and a table to document NAPL measurements will be submitted with the quarterly groundwater monitoring reports. Phase III GDGI reports included figures that documented where the thickness of LNAPL were measured to be greater than 0.01 feet.

- d. **Provide decommissioning/removed dates for all wells (i.e., footnote c).**

Table F-1 has been revised to provide dates of decommissioning for all decommissioned wells.

- e. **Add rationales for decommissioning/removing wells.**

Explanations for why wells were decommissioned have been added to the comments column (see the Navy's response to DTSC Parcel E comment 12b, above).

- f. **Correct following problems immediately:**

IR18MW12A, IR28MW190F, IR09MW31A, IR09MW35A(?), IR01MW402A, IR01MW101A2, IR12MW19A: resurvey;

Monitoring wells that need new survey data will be surveyed before potentiometric maps are created from quarterly groundwater elevation data. However, neither well IR18MW12A nor IR12MW19A is proposed for groundwater elevation monitoring (or sampling), and the need for resurveying these two wells will be evaluated in the future.

IR10MW14A: provide lock;

A lock was provided for well IR10MW14A during the first round of samples to be collected under this plan.

IR28MW310F: replace stovepipe and casing and redevelop if needed;

The current condition column of Table F-1 indicates that the vault for well IR28MW310F was repaired as part of the TCRA in May 2002. There is no indication of a need to replace the stovepipe or casing at well

IR28MW310F. The current condition column in Table F-1 for well IR28MW313F, however, indicates a need to replace the stovepipe and the casing as well as to potentially redevelop the well if needed. Well IR28MW313F has not been proposed for sampling, although Table H-2 indicates potential future sampling. Well IR28MW313F will be repaired in the event that it is added the sampling program in the future.

IR28MW329A, 330A, 331A: explain what is meant by “screen compromised”;

The three monitoring wells, IR28MW329A, IR28MW330A, and IR28MW331A, are all planned for decommissioning. The wells are all 0.75-inch diameter PVC wells. The term “screens may be compromised” means that it is not possible to extend sampling or water level measurement equipment inside the well because of an obstruction, bend in the casing, or other obstacle that is preventing these apparatus from reaching the well screen.

IR28MW333A: inspect and replace vault if needed;

Well IR28MW333A will be inspected as part of the quarterly groundwater monitoring program to evaluate the need for a new vault. If the well is determined to require a replacement vault, then the repair will be made as part of the quarterly monitoring program.

IR29MW56F: replace bolt and seal if needed;

The current conditions column of Table F-1 indicates that the vault for well IR29MW56F was replaced as part of the TCRA in May 2002. A new vault includes new bolts and a new seal.

IR09MW31A: replace vault if needed;

Well IR09MW31A will be inspected as part of the quarterly monitoring program to evaluate the need for replacement of the vault. If the well is determined to require replacement of the vault, then it will be repaired as part of the quarterly monitoring program.

IR09P040A: locate, inspect, and repair as needed;

Well IR09P040 will be located, inspected, and repaired if necessary as part of the first quarterly monitoring event. This well has been proposed as a groundwater sampling location for cyanide.

PA33MW37A: repair flanges, replace vault if needed;

Well PA33MW37A will be inspected as part of the quarterly monitoring program to evaluate the need for replacement of the vault. If the well is determined to require replacement of the vault, then it will be repaired as part of the quarterly monitoring program.

IR35MW01A: inspect and repair as needed;

Well IR35MW01A will be inspected as part of the quarterly monitoring program to evaluate the need for repair. If the well is determined to need repair, then it will be repaired as part of the quarterly monitoring program.

PA35P01A: repair flanges, replace vault if needed;

Well PA35P01A has not been proposed for either groundwater sampling or groundwater elevation measurements. Inspection and repair of this well will be completed in the future.

IR01MW17B: remove obstruction, repair casing;

The obstruction in well IR01MW17B, at a depth of 23 feet bgs, will be removed and the well will be inspected to evaluate whether the well casing needs repair. If the well is found to require repair, then it will be repaired as part of the quarterly monitoring program.

IR01MWI-6: repair casing;

The "current condition" column for well IR01MWI-6 in Table F-1 indicates that the well's casing may be bent. Well IR01MWI-6 will be inspected to evaluate whether the well casing should be repaired. If the well is found to require repair, then it will be repaired as part of the quarterly monitoring program.

IR01MWI-7: repair stovepipe; and

The "current condition" column for well IR01MWI-7 in Table F-1 indicates that the well's stovepipe may require repair. Well IR01MWI-7 will be inspected to evaluate whether the stovepipe should be repaired. If the well is found to require repair, it will be repaired as part of the quarterly monitoring program.

IR01MW101A2: repair casing.

Monitoring well IR01MW101A2 does not exist.

13. **Comment:** **Figure 3 (and elsewhere). Dry Docks that are flooded should be shown in blue, like the San Francisco Bay**

Response: Figure 3 has been revised to show submerged dry docks as the same color of blue that was used for San Francisco Bay.

Appendix G Water Level Survey Information

- a. Please include all paired wells, all deeper wells, and all bedrock wells.**

Table G-1 and Figures G-1 and G-2 have been revised to include all well pairs for water level measurements.

- b. All sampling wells should be included in the water level monitoring program. The text notes that water levels will be taken**

at these wells but that all sampling wells are not part of the groundwater level sampling program. This rationale is not sufficient, since the local flow characteristics (and potential impacts on contaminant migration) around sampling wells should be determined. At a minimum, groundwater levels at sampling wells should be evaluated with respect to nearby wells in the groundwater level monitoring program. Anomalies should be identified and wells with anomalies should be included in the next quarterly sampling event.

Response: It is not necessary to include every monitoring well being sampled in the groundwater level measurement. Groundwater levels will be measured in all monitoring wells proposed for sampling when they are sampled and as part of the sampling protocol. The monitoring wells selected for water level measurement in the basewide event will provide a substantial data set to characterize groundwater flow.

c. In addition to the dominant effect of sanitary system pumping (discussed above), groundwater flow in several regions of the site is controlled by anomalous mounds and sinks, including:

i) The large elliptical mound in the eastern portion of Parcel B;

The Navy acknowledges the consistent presence of an elliptical-shaped groundwater mound in eastern Parcel B. The groundwater mound may be due to the presence of bedrock near the ground surface and the relationship to the no flow boundary along the sea wall on the landward side of the dry dock 3. Three existing wells and four newly proposed wells will be added to the groundwater elevation monitoring network that had been used in the past to help evaluate the nature of the mound at IR-20. Changes to this feature, as a result of alterations to the utility system, have not been demonstrated. Still, the proposed groundwater elevation monitoring network will provide a substantial data set for continued monitoring of flow patterns in this area.

ii) Mound in Parcel C near IR28MW394A (since the mound at IR28MW394A is defined by one well only, additional monitoring points nearby may be able to establish whether the feature is "real" or a well anomaly);

The groundwater mound at well IR28MW394A was also present during the basewide groundwater level measurement conducted on February 14, 2001. Two A-aquifer monitoring wells are proposed to be installed at the upgradient lateral edges of the groundwater mound at well IR28MW394A that are intended for groundwater elevation monitoring. Additionally, Figure G-1 and Table G-1 have been revised to indicate that well IR28MW290A will also be added to the groundwater elevation monitoring network to help verify and define the nature of the groundwater mound.

iii) Parcel D mounds at Building 530, PA33MW37A;

The groundwater mounds in Parcel D near Building 530 and well PA33MW37A are considered related to the transition between the Bay and the groundwater sink in northwestern Parcel D. The Navy will continue to monitor groundwater elevations in these areas and has added both existing wells and proposed new wells to the groundwater elevation network in Parcel D. Both the existing well PA33MW36A and the proposed new well IR71MW04A have been added to the groundwater elevation monitoring network in the vicinity of the mound at well PA33MW37A. With the addition of these two wells to measurements in Phase III of the GDGI, all monitoring wells within and along the perimeter of the mound at well PA33MW37A will be monitored for groundwater elevations. In addition to wells measured during Phase III of the GDGI, existing wells IR17MW11A and IR73MW04A have been added to the groundwater elevation monitoring network in the vicinity of the mound at Building 530.

(iv) Parcel E mounds at IR11MW25A, IR02MW114A1, IR36MW126A.

The groundwater mound at well IR11MW25A has consistently been present for several years. It is considered related to the local bedrock high at that location. The groundwater mound at well IR11MW25A is consistent and has a natural source.

The groundwater mound at well IR02MW114 has also been consistently present for years. The groundwater elevations observed at well IR02MW114 coincide with the apex of a groundwater divide that parallels the central shore of Parcel E, from the landfill down to the oil ponds area. The Phase III GDGI report for Parcel E (Tetra Tech 2003e) suggested that the divide could be the result of a complex of leaking water lines. Eight monitoring wells along the groundwater divide have been added to former groundwater elevation monitoring network to help characterize the flow regime and monitor changes in this area.

The groundwater mound at well IR36MW126A has also consistently been present for several years. This groundwater mound could be related to nearby submerged sanitary and storm drain lines. Three monitoring wells surrounding the groundwater mound at well IR36MW126A have been added to the previous groundwater level monitoring network that had been used during the Phase III GDGI; these wells are IR36MW127A, PA36MW04A, and PA36MW07A.

(v) Changes in pumping will affect these features, as noted above. Please confirm that contingency plans exist to monitor flow around such features, pending changes to the pumping regime.

Aside from the mound at well IR11MW25A, which is attributed to a natural bedrock high and has been found to be consistently present, the Navy has proposed additional locations for groundwater elevation monitoring beyond the networks used during the Phase III GDGI. These additional locations are all in the vicinity of the groundwater features

identified above. These expanded monitoring networks will provide sufficient data to recognize changes to established patterns of groundwater flow.

- d. **At TSs, it is not possible to fully assess the ground water level measuring program, since soil, gas and groundwater data has not all been received and reviewed. Impacts of TSs on groundwater levels should be discussed and the need for specific monitoring at TSs evaluated. Denser data points close to TSs are warranted (especially in pumping or injection areas).**

Treatability study reports will be presented elsewhere. The Navy evaluated patterns of groundwater flow in the GDGI reports and has designed the proposed groundwater elevation monitoring plan by expanding on past measurement events.

- e. **Repaired water lines are shown on figures (e.g., Figure 3), but the significance of the repairs is not clear. For example, PCE has increased in IR29MW85F: is this increase related to water line repairs north of Building 281? The Navy should assess the impacts (if any) of repairs on groundwater flow and contaminant migration. Please provide additional information regarding the repairs, including date and work done. Add the dates of repairs to water surface contour figures. Also, it would be useful to have repairs summarized on a table.**

Repaired water lines are shown on the figures because they represent features that may have had an impact on patterns of groundwater flow or contaminant migration. The Navy did not choose to show these features in an attempt to evaluate the significance of each repair, but rather to graphically provide information.

- f. **All potential barriers to flow and all pumping systems for gas and groundwater should be shown on groundwater level figures.**

Figure 3 in the draft SAP, the map of A-aquifer groundwater elevations, shows submerged utility lines, sheet pile walls, seawalls, the 1935 shoreline, repaired water lines, and the location of the pump house in Parcel D. These features and others that have the potential to alter patterns of groundwater flow will continue to be shown on groundwater elevation maps.

- g. **Discrepancies. Reviewers necessarily rely heavily on figures. However, there are many discrepancies between figures (and tables) which confound the review process. For example, figures do not agree with respect to decommissioned wells, especially in Parcel B (as noted in previous Comments on Parcel B). Other examples: on Figure G-1, all wells are not included, all well names are not included, all removed wells are not noted as such (e.g., near IR07MW29A). On Figure 3, some well names are "floating"**

on the figure—unassociated with well locations (especially in the eastern portion). Please correct these problems.

Inconsistencies between figures and tables have been reconciled and corrected.

- h. Please revise Figures G-1 and G-2 to include all site wells (including removed wells) so that the reviewers can properly evaluate the proposed program and make recommendations for additional or different wells to be included.**

Figure G-1 is intended to show all wells screened in the A-aquifer, including wells that were decommissioned wells or that were not selected for groundwater level monitoring. Figure G-2 is intended to show all monitoring wells screened in the B-aquifer and bedrock water-bearing zones, including wells that were not selected for groundwater level monitoring.

- i. Please include well names for all wells (on Figure G-1 and G-2), including wells not selected for groundwater level measurements. It is difficult to evaluate potential alternate wells for selection in the BGMP when well names are not provided for all wells. For example, UTOMW15A(?), IR46MW37A(?) and IR24MW06A (?) are not labeled on Figure G-1.**

Labels for wells that were not selected for groundwater level measurements are not provided on Figures G-1 and G-2 because the figures are intended to show and highlight where groundwater elevations will be measured. Symbols for wells that were not selected for measurement are shown without labels because the labels would unnecessarily clutter the figure and make it more difficult for field personnel to follow.

- j. On Parcel C, IR28MW149-A1 (replacement well for decommissioned 149A) should be included for water level measurements.**

The well mentioned, IR28MW149-A1, does not exist. The Navy does not intend to replace decommissioned well IR28MW149A. Please see the Navy's response to DTSC Parcel C specific comment 1d.

- k. On Parcel E, a mound at IR01MW07A and 11A has persisted. 07A and 11A have been removed: replacement wells should be identified to monitor the mound.**

Well IR10MW12A, located within the mound, had already been proposed as a location for groundwater level monitoring. The Navy has revised both Figure G-1 and Table G-1 to include well IR01MW10A, also within the mound, as a location for groundwater level monitoring.

- l. Please add IR28MW313F as an upgradient groundwater level monitoring well for the groundwater divide.**

Well IR28MW313F already had been proposed as a location for groundwater level monitoring. Well IR28MW313F is a monitoring well in the bedrock water-bearing zone and is shown on Figure G-2 and listed in Table G-1.

m. The symbol for water utility line is not included in legends for Appendix G (and other) figures.

The symbol for water utility lines is shown in the legend of every figure where the lines appear. It is possible that the symbol appears faint on hardcopy versions of the figures, and the Navy will take steps to ensure that these symbols are visible in the hardcopy submittals of the final report.

REFERENCES

- Naval Sea Systems Command. 2004. "Draft Final Historical Radiological Assessment, Volume II, Hunters Point Shipyard." February.
- PRC Environmental Management, Inc. (PRC). 1996a. "Draft Final Parcel B Remedial Investigation, Hunters Point Shipyard, San Francisco, California." June 3.
- PRC. 1996b. "Draft Final Parcel B Feasibility Study, Hunters Point Shipyard, San Francisco, California." November 26.
- Puls, R. W. and M. J. Barcelona. 1996. "*Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures*." EPA publication EPA/540/S-95/504. April.
- Tetra Tech EM Inc. (Tetra Tech). 1999. "Final Remedial Action Monitoring Plan, Parcel B, Hunters Point Shipyard, San Francisco, California." July 2.
- Tetra Tech. 2001a. "Draft Petroleum Hydrocarbon Corrective Action Plan, Parcel B, Hunters Point Shipyard, San Francisco, California." January 10.
- Tetra Tech. 2001b. "Distribution of the Bay Mud Aquitard and Characterization of the B-Aquifer in Parcel B, Technical Memorandum, Hunters Point Shipyard, San Francisco, California." February 19.
- Tetra Tech. 2002. "Draft Parcel B Construction Summary Report, Hunters Point Shipyard, San Francisco, California."
- Tetra Tech. 2003a. "Draft Parcel C Groundwater Summary Report, Phase III Groundwater Data Gap Investigation, Hunters Point Shipyard, San Francisco, California." March 19.
- Tetra Tech. 2003b. "Final Parcel D Information Package for Installation Restoration Site 22, Phase III Groundwater Data Gaps Investigation (Revision 01), Hunters Point Shipyard, San Francisco, California." May 9.
- Tetra Tech. 2003c. "Cost and Performance Report, FEROX® Injection Technology Demonstration, Parcel C, Remedial Unit C4, Hunters Point Shipyard, San Francisco, California." July 11.
- Tetra Tech. 2003d. "Final Parcel C Groundwater Summary Report, Phase III Groundwater Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California." September 2.
- Tetra Tech. 2003e. "Final Parcel E Groundwater Summary Report, Phase III Groundwater Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California." October 17.
- U.S. Environmental Protection Agency (EPA). 1992. "Estimating Potential for Occurrence of DNAPL at Superfund Sites." Publication 9355.4-07FS. January.

U.S. Department of the Navy (Navy). 1997. "HPS, Parcel B, Final Record of Decision." Issued by the Department of the Navy, Engineering Field Activity West, Naval Facilities Engineering Command San Bruno, California. October 7.

Navy. 2002. Memorandum from Richard Mach, Navy BRAC Environmental Coordinator, to the HPS administrative record file.